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Rainier Pulp & Paper Co. Has Record Earnings

After Depreciation, Provisions for Losses in Disposing of Capital Assets, Federal Taxes and Other Charges, Shows Net Profit of $743,509 for the Year Ended April 30—This is Said to be the Largest Profit in the Company's History, the Former High Mark Being $458,460 Registered in the Preceding Year

The report of the Rainier Pulp and Paper Company with plant located at Shelton, Wash., for the fiscal year ended on April 30 shows a net profit of $743,509 after depreciation, provision for losses in disposing of capital assets, Federal taxes and other charges. It was the largest profit in the company's history and compares with one of $458,460 in the preceding year.

Under the participating provisions of the shares; the profit was equivalent to $3.33 a share on the combined 100,000 no-par shares of cumulative participating Class A stock, on which there is an accumulation of unpaid dividends, and 123,000 no-par shares of Class B common stock. This compares with $2.06 a share on the combined stocks in the previous year.

It applied directly to the Class A stock, the net profit was equal to $7.43 a share, against $4.58 the year before. Class A stock has preference as to cumulative dividends of $2 annually and participates equally share-for-share with the Class B common stock, after the latter has received $2 a share.

Complete Plans for Champion Merger

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, July 15, 1935—Announcement has been received here from New York that plans to merge the Champion Coated Paper Company of Hamilton and the Champion Fibre Company, subsidiary, of Canton, North Carolina, have been completed at conferences between company officials and members of a banking syndicate which will offer new securities in a recapitalization project.

It is stated that a name for the new company is yet to be selected. J. M. Hutton, of the firm of W. E. Hutton & Co., is assisting in the reorganization plans. Mr. Hutton is well known in financial circles of Dayton and the Miami Valley.

Funded debts and outstanding stocks of the Champion Coated Paper Company and the Champion Fibre Company will be replaced in the near future by issues of $5,500,000 in 4¾ per cent debentures and $6,000,000 of 6 per cent preferred stock.

The new company, it was explained by Mr. Hutton, will offer the stock to the present holders at a ratio of 11 shares for each 10 shares of preferred, which is callable at $110, and 10½ shares for each 10 shares of special preferred, callable at $105.

The two issues are being underwritten by W. E. Hutton & Co., and Goldman, Sachs & Co., New York.

It is said that further detailed information concerning the issues, including the price at which the stock and debentures are to be offered on the open market, depend upon the registration of the issues with the Securities and Exchange Commission.

Detailed information for submission to the Commission is now being prepared by the companies' accountants, and the registration may be effected within two weeks, Mr. Hutton said.

According to Mr. Hutton, the new debentures and stocks will be more than sufficient to cover those now outstanding. The balance accruing from their sale will be credited to the new company's reserve, he asserted.

In the latest available balance sheets, Champion Coated Paper had outstanding $1,000,000 of preferred stock, $2,350,000 of special preferred stock, and $456,000 of 6 per cent sinking fund notes.

Champion Fibre had outstanding $2,219,600 of first preferred stock, and $1,576,500 of 6 per cent sinking fund notes.

Portions of the funded debt have been retired since publication of this financial statement in 1934.

Mersey Paper Co. Producing Yeast

MONTREAL, Que., July 15, 1935—The Mersey Paper Company, of Liverpool, N. S., has officially opened a plant for making yeast from waste product of its pulp mill. The plant is the first of its kind in North America.

The new process, discovered by Gustav Heijkenskjold, a Swedish scientist, makes yeast from ordinary pulp liquor. The only other plant of this kind is situated in the inventor's homeland.

A general inspection of the plant was made a few days ago by visitors invited by E. W. Ewson, an associate in Mr. Heijkenskjold's discovery and president and general manager of the factory here. Among the visitors was the Hon. A. S. MacMillan, Nova Scotia Minister of Highways and acting Premier of the province.

Standardizing Fiber Board for Shippers

U. S. Forest Laboratory Officials Carry On Tests at Madison, Wis.—Objectives Are Lower Manufacturing Costs and Better Materials—Section Equipped With Complete Pulp and Paper Machinery—Strength Tests Conducted With Tuckerman Optical Strain Gauge

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., July 15, 1935—Standardizing for the benefit of shippers the $165,000,000 worth of fiber board manufactured annually in the United States is being carried on in tests at the United States Forest Products Laboratory at Madison, Wis. Guesswork both in manufacture and use will be eliminated when the program is completed.

Lower manufacturing costs and better materials are the objectives. Laboratory officials expect the results will be reflected in higher profits to thousands of shippers of foods, clothing, utensils and other products packed in fiber boxes, as well as in the greater economy of production resulting from improvements in manufacturing methods. Lower prices to consumers also are expected to result, because of the elimination of shipping losses now running into millions of dollars annually.

Tests are so planned that manufacturers will be able to calculate the strength of any size and shape of box, its ability to withstand the jars and bumps of transit, and its load capacity. Engineers will conduct their research along lines previously laid down in the laboratory in similar tests of the strength properties of wooden boxes, conducted several years ago. The gradual replacement of fiber boxes for wooden ones led to the new research program.

Improvements in manufacture will be sought in the pulp and paper section of the laboratory, which is equipped with complete pulp and paper machinery. Strength tests will then be conducted with the Tuckerman Optical Strain Gauge. This device, under rigidly controlled atmospheric humidity conditions, tells the degree of stiffness in small strips of paper. A tiny mirror rotates as the paper is stretched, throwing a beam of light on a small scale that indicates the amount of stretch.

Strength formulas so derived will be correlated with others gained from tests on the strength of finished fiber board, as well as still others calculated from tests of completed boxes. Sound construction principles will thus be worked out.

A large circular drum will be used for tests on completed boxes, both filled and empty. The drum, when revolved, jolts, drops and slides boxes around much as they are pushed and handled during transit, loading and unloading.

This service is considered important to the industry, which produced 3,300,300 tons of fiber board in the United States in 1932. The production volume has more than doubled in the last decade.

Processed Leather Made on Paper Machine

Manufacture of processed leather on paper machines is being carried on successfully at Kaukauna, Wis., by the Wilson Leather Company. The plant has been operated for the last two years and is making a high grade of leather used for hat bands, shoe liners, handbags and other items. Half of the Patten Paper Company's mill has been leased, and the machines were remodelled to carry on the process.

Up to that time, no commercial use had been found for the vast amount of waste dumped by tanneries and leather manufacturers. Dr. J. F. Wilson of Milwaukee, Wis., developed a process which will separate the fibers in leather as is done with paper. He is a prominent chemist who experimented for a long period. Large quantities of waste leather are being bought up and processed. Difficulties were experienced at first because the leather pulp, after being run over the machines, was not commercially practical because of hardness. A year of work resulted in a strong, pliable sheet of substitute leather. The Wilson products are in big demand, and the future of the industry appears to be unlimited. The product produced is said to be far superior to the imitation leathers on the market. Charles Cochnauer is manager of the company, with which Dr. Wilson is associated.

Pulpwood Shipments Increase

Railroads of the upper peninsula of Michigan report a notable increase in the summer volume of pulpwood shipments. The demand for jack pine has become such that it commands the highest price. Its use in many of the specialty plants, especially in the waxed wrapping industry, is held responsible for the heavy movement to Wisconsin mills. Trucking from the woods to the rail points is going on extensively, with some hauls as much as sixty miles. The summer movement takes up a seasonable slump, and is expected to be the source of steady freight business in the future. The demand for jack pine is attracting attention to its commercial value, and is encouraging the planting of new areas to meet the future needs of mills.

Tax Bill May Cause Further Losses

Following closely upon the announcement that the Menasha Products Company division of the Marathon Paper Mills Company at Menasha, Wis., had lost $350,000 worth of business annually from the Jelke Company in carton manufacture because of Wisconsin's newly enacted 15 cents per pound tax on oleomargarine, comes a declaration from the Wisconsin Manufacturers Association that paper mills of the state stand to lose a total of $1,000,000 in business annually. This move comes from the southern state in retaliation for the "embargo" which shuts out a market for cottonseed oil and other products.

An attempt was made to recall the bill before signature by Governor LaFollette, but the legislature refused to respond and the bill was signed and became law. Even the legislators from the districts where the affected mills are located refused to take action, saying they were elected by the dairy farmers whom they are trying to protect against oleomargarine competition. With the legislature still in session, some relief is hoped for before the retaliatory steps become serious.

Fights Processing Taxes

Wisconsin manufacturers of paper towels have started a war against the processing taxes assessed against them under the Agricultural Adjustment Act by starting court action challenging the constitutionality of AAA. The Fort Howard Paper Company, Green Bay, Wis., led the fight by starting a suit in the federal court at Milwaukee enjoining Otto A. LaBudde, collector of internal revenue, from collecting the processing tax. The action involves $1,375 in taxes, and a permanent injunction is sought after a court test. A hearing was to be held last week.

It is reported that the company took action after NRA was declared unconstitutional. Paper towel manufacturers have been forced to pay the processing tax since December 1, 1933, on the ground that they are competitors of cotton towels. While the mills challenged the accuracy of this finding, they have paid the tax up to the present time.

Another suit involving AAA processing taxes has been filed by the Peavey Paper Products Company of Ladysmith, Wis., against the school board and city of Milwaukee, Wis. The action in the circuit court at Milwaukee seeks to recover $1,250, the amount of the tax on $9,178 worth of paper towels sold the school board in November, 1933. It is contended the board failed to keep a promise to pay the AAA tax on the towels purchased.

News of the Industry

Immediate employment of 1,237 men, mostly from relief rolls, for national forest work in nine middlewest states is announced by E. W. Tinker, Milwaukee, Wis., regional federal forester. Wisconsin's allotment of federal funds, out of $997,936 appropriated for this work, will be $163,815. The Chequamegon Forest at Park Falls, Wis., will hire 121 men, and the Nicolet National Park at Rhinelander, Wis., 120. These will be additional to the enlarged Civilian Conservation Corps, also at work on reforestation, fire control, road building and other improvements in forest areas.

Consolidated Water Power and Paper Company's first raft of 9,500 cords of pulpwood from Jean Pierre Bay, Canada, has arrived at the loading hoist at Ashland, Wis. It was towed successfully across Lake Superior by the company's shipping subsidiary, the Newaygo Tug Lines, Inc. Immediate loading was started for rail shipment to the mills at Wisconsin Rapids and Biron, Wis. Four more rafts will be brought across this season.

Peter Krogen, manager of the Newaygo line, has been transferred to Isle Royale, in Lake Superior, where the company is logging off its timber lands. He will assist John Lindblom, former tug line manager, who also was transferred there to supervise operations. The timber will be rafted across after it is cut. The new manager of the shipping operations has not been appointed, but Phil Nobles has been transferred to Ashland from the Consolidated Mill at Stevens Point, Wis., to take charge of pulpwood movements. Twenty-seven men are employed at the pulp hoist.

Heavy rains this spring and summer have cut to a negligible quantity the amount of coal needed by paper mills of the Fox River Valley, according to officials of the Fox River Navigation Company, the shipping company operated co-operatively by the mills to barge coal from the docks at Green Bay, Wis. Usually at this time of the year the mills are heavy users of steam power because of low water, but the water power supply is as ample now as at any period of the year. The situation is a distinct contrast to a year ago, when the water levels were the lowest in history due to drought.

Appleton Wire Works, Appleton, Wis., is constructing a second story addition to its warehouse. The structure will be of brick, and is 36 by 103 feet in size, and approximately 10 feet high. Need of additional storage space necessitated the addition. The contract was awarded to Greunke Brothers, and the cost is approximately $4,500.

The regular meeting of the executive committee of the American Paper and Pulp Association, usually held in New York City, was being held instead last week end at the home of its president, F. J. Sensenbrenner. He has a beautiful estate east of Neenah, Wis., on Lake Winnebago. Members of the committee were to make a visit to the Lawrence Institute of Paper Chemistry at Appleton, Wis., during their stay.

Workmen are rebuilding a section of the splash boarding on the Consolidated Water Power and Paper Company's dam at Wisconsin Rapids, Wis. The section was carried away by high water, but most of the timber was recovered through prompt action by company employees. W. F. Thiele, chief engineer of the company, is in charge of the work. The loss of water from the storage pond was not enough to impair water power.

Paydays weekly instead of semi-monthly are to be put into effect this month at the Menasha Products Company Division of the Marathon Paper Mills Company, at Menasha, Wis. The same plan is to go into effect at the George Banta Publishing Company of Menasha.

Charles W. Cassell, of Indianapolis, Ind., and Miss Lucille M. Ozanne of Neenah, Wis., were married July 6 at the bride's home. Mr. Cassell is a graduate of Purdue University, and for the last two years was a student at the Institute of Paper Chemistry, Appleton, Wis. He is now employed at Westminster, Md., where the couple will reside.

The marriage of James J. Kraus, Jr., Niagara Falls, N. Y., and Miss Margaret Voitik, Joliet, Ill., took place July 13 at Niagara Falls. Mr. Kraus formerly resided at Appleton, Wis., and is in the engineering department of the Kimberly-Clark Corporation's mill at Niagara Falls. He previously was employed at the company's main office at Neenah, Wis. The couple are spending a two weeks' honeymoon in Canada.

Edward W. Goodrich, who years ago invented a paper mill screen, excelsior pad matting, spinning machine for twine for grass rugs, and other devices, died July 11 at his home at Appleton, Wis., at the age of 79. He also assisted in constructing the world's first hydro-electric plant at Appleton. Burial took place in Riverside cemetery at Appleton.

William S. Taylor, who was manager of the Pulpwood Company, Appleton, Wis., for more than 25 years, died July 13 at the home of his son, Eugene Taylor, at Kalamazoo, Mich. He was 79 years of age. The company was operated co-operatively by a number of paper mills to obtain their annual wood supply. Mr. Taylor had been retired for a number of years, and left Appleton five years ago. The body was conveyed to Appleton for burial.

Riegel Paper Corp. Raises Wages

[FROM OUR REGULAR CORRESPONDENT]

MILFORD, N. J., July 15, 1935.—Employees of the Riegel Paper Corporation, with plants at Milford, Riegelsville, Hughesville and Warren Glen, have been notified of an increase of 5 per cent in their wages, effective from July 1.

They will receive their increased pay on the next payday, July 17. The increase does not affect office and laboratory employees, or those employed in supervisory capacities. About 850 employees in the four mills are affected.

An official of the plant has announced that the plants will continue to work the same hours specified by the NRA.

Paul Foster Calling On Western Mills

Paul Foster of the Williams Gray Company just returned from the American Wringer Company, Inc. factory at Woonsocket, R. I. where he received a course of training in the manufacture of Tensilastic rubber covered rolls.

Mr. Foster is calling on the paper mills in the Middle West for the Williams Gray Company in the interest of Tensilastic rubber covered rolls.

Chicago Paper Market Exhibits Midsummer Lull

Demand for Practically All Standard Grades of Paper Slackens—Outlook for Newsprint Paper Considered Uncertain—Ground Wood Papers Only Moderately Active—Position of Paper Stock Division Practically Unchanged

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., July 15, 1935—An easily discernible slowing up of the Chicago paper market made its appearance during the past seven days. No particular grades seemed to have escaped the slackening and no grades were outstanding in bucking the current. However, market conditions were reported as more than usually favorable inasmuch as the slowing up in demand seemed to have no appreciable effect on price—except in the rumors of a few purchasing agents who insist on believing that they may be able to some day get paper for nothing.

The newsprint market was reported as uncertain with definite statements that improved prices must come counteracted by countinued inactivity on the part of those who might raise the prices. Ground woods slowed up over the improvement of the past few weeks. Fine papers made no headway and found the combination of off-season waiting and vacation time a little too much to cause progress. Markets, however, remained firm. Books and covers tapered as the advertising and publishing world slackened up prior to Fall improvement. Waste papers made no headway largely because reports indicate that local buyers are fairly well committed already.

Nation Wide Papers Formed

Announcement of the formation of a new merchandising company to be known as Nation Wide Papers, Inc., has caused a great deal of conversation and conjecture in the Chicago paper market. It is common knowledge that thirty paper merchants having an invested capital of about $20,000,000 tied up in their own stock paper houses have organized this company with sufficiently broad powers to permit them to carry on considerable of a merchandise program.

There is less mystery about the men behind the organization which requires that their member concerns be solvent and not dictated to by bank or mill; that it must have a successful operating record and know their costs and that the concerns must be well established over a period of years. The gentleman giving out all information so far is George E. Frazer, Chicago attorney and accountant with offices in the Board of Trade Building, Chicago. The directors of the concern are R. S. Bull, Bradner Smith & Co., Chicago; John Leslie, John Leslie Paper Company, Minneapolis; I. W. Carpenter, Jr., Carpenter Paper Company, Omaha and C. A. Esty, Carter Rice Company, Boston. The directors will hold a meeting on July 17 and probably decide just how much additional information will be revealed as to policy, member concerns, warehouses, etc.

"I see no reason," said Mr. Frazer when interviewed, "for any particular excitement about this company. It is simply an effort to form a merchandising company for mutual benefit and all members are or will be very well and favorably known to the trade as the directorate already implies. We now have thirty warehouses in our group and thirty more under consideration. Naturally, we do not wish to divulge any names until the organization is completed. Each firm will be in a non-competitive area and only one in each non-competitive market will participate in the benefits to be derived from the cooperative effort."

It seems logical to assume that Nation Wide Papers, Inc., will have considerable to do with private marking problems, inasmuch as Mr. Frazer feels that the paper merchants will not talk freely about competitive problems with those in the same competitive market area but will be willing to exchange information with those outside this market. The matter of preferential discounts will also probably be a part of the basic program and a fact-finding body has already been set up to aid in securing fair and intelligent competition based upon sound merchandising principles.

Increased Paper Shipments Expected

Substantial increases in shipping are expected in the midwestern area, according to the Mid-West Shipper's Advisory Board, which has indicated an expectancy that shipments of paper will be up 7 per cent during the balance of 1935. The Board met in Chicago on July 12 and found it necessary to revise estimates which had placed the number of freight cars desired for the third quarter as 2 per cent under a like period in 1934. The revision is reported as a strong indication of a fundamental improvement in business. While decreases are expected in coal and coke and grain and livestock and while such commodities as iron and steel, acids and chemicals and glass and corn products are expected to hold their own, sufficiently strong reports have come in from the paper industry to make a revision upward of seven per cent.

Division of the paper industry supplying the advertising field will be interested to learn that Chicago now has a permanent advertising art exhibit located at 43 East Ohio street. Here, on swinging racks, will be a vast array of every kind of advertising art where art buyers can acquaint themselves with art produced for national publications, newspapers, trade papers, direct mail advertising, mail order catalogs, packages, etc. The exhibits will be in charge of the Associated Artists and Studios of Illinois and are based on preliminary exhibits at Carson Pirie Scott & Co., which attracted a great amount of attention from paper and allied fields.

News of the Trade

The palm to the Oxford Paper Company and its Chicago distributors—Bermingham & Prosser and Bradner Smith & Co., for a novel selling approach. Here is a new direct mail piece on the subject of forgetting and the copy points out the need for graphs, charts and records and careful type selection to eliminate "forgetting." Naturally, Oxford English Finish, on which the mailing is printed, and other Oxford lines are written in as most suitable for standardization and for performance that eliminates the danger of forgetfulness and inattentiveness.

No Saturday business will be transacted by Chicago fine paper merchants during the months of July and August, the fine paper houses basing their action on a survey which showed that most printing plants were going to close down on Saturday during the same period. No deliveries will be made on Saturday unless previously placed orders have specified Saturday delivery. Fine paper houses are generally following the closing program which seems to strike a popular—as well as a sensible—chord locally.

Ontario Paper Mills Are Moderately Active

Several Fine Paper Manufacturers Report Receiving Some Good Orders—Others Find Business Rather Slow—Demand for Various Grades of Coarse Paper Light—Tissues and Light Weight Papers Moving Well—Greaseproof and Waxing Papers Steady

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ontario, July 15, 1935—Paper turnover by both the mills and jobbers in Ontario has been light since the first of the month. This has been caused chiefly by the prevalence of the holiday season and the talk of an imminent general election in the Dominion. Paper wholesalers indulge in a good deal of speculation as to which party will afford the greatest protection to the paper industry and paper consumers are inclined to hold off commitments until it is seen which of three political parties is to govern following the impending battle at the polls.

With this feeling existing throughout the industry sales volume has been light for some weeks, while the holiday season has been playing its part in the generally quiet times that have set in.

Possibly the mills have been slightly busier than the distributors and several of the fine paper manufacturers report that they are getting some very good business, particularly in Western Canada. In the case of Provincial Paper Mills, one of the largest fine paper organizations, the West is supplying them with some substantial orders and a few of the plants in central and Eastern Canada say that volume is keeping up better than at this time last year. Other mills report business as rather quiet.

One big distributing house in Toronto stated that for some time past now the tendency on the part of the paper consuming public had been towards the better class of paper and that an apparent permanent change in this direction had been discernible since the summer season.

For the most part the coarse paper trade has been light of late and quiet conditions now prevailing are expected to last till well on towards fall. There is very little stocking of supplies either in fine or coarse papers and the printing industry is making comparatively light requisitions. The printing trade is quiet although photo engraving and similar lines are fairly active. The paper converting trade has not improved greatly during the past several weeks and there is only a light call for envelopes and general stationery. Tissue and light weight paper lines generally are moving quite well and there is a fair demand for greaseproof and waxing papers.

Pine Falls Paper Plant Reopens

The giant machinery in the plant of the Manitoba Paper Company at Pine Falls, Man., turning on July 8 for the first time since February, 1932, brought new life to the little pulp town, as 200 men returned to work. It was a day of rejoicing. The shriek of whistles sounded the welcome call to labor, and the town turned out in a body to see the plant that is bringing life to it again. For the past six weeks a crew of ninety men has been busy getting the machinery in shape for operation, and at 8 a.m. on July 8, the first spruce logs were dumped into maws of barking machines. Supplies on hand are 75,000 cords, enough to keep the mill going for a year and a half.

Ultimatum Given Pulp Strikers

With upwards of 1,000 pulp-camp workers on strike, timber operators at Port Arthur, on July 8, notified the men that if they did not return to work within a week the camps would be closed. The strike was called by the Industrial Lumber Workers' Union, demanding increased wages. Men from the Head of the Lakes to the camps of Nipigon district were affected. Several men who returned to work in th camps of Thomas Falls last week were induced by strike pickets to leave the operations over the week-end. There were reports that pickets would be prosecuted for entering the timber areas without a permit from the Forestry Department, but official comment could not be obtained.

Great Lake Sale Important

The sale of the Great Lakes property in a few weeks time will provide an interesting example of whether or not new capital can be attracted to the newsprint industry at the present time. . . The Great Lakes unit at the head of the lakes, is comparatively modern. The mill has two machines; pulpwood supply is adequate and in close proximity to the mill, while shipping costs to the market compare favorably with other mills in the same area. There is a $10,000,000 bond issue on the property. With the co-operation of the bondholders committee these bonds could be used to bid in the property, but still considerable cash will be required to place the company's working capital in a sound position.

Hearst May Buy the Mill

The serious angle to the enforced sale of the property from the point of view of other Canadian manufacturers, is the possibility of Hearst securing control. It is well known that Hearst is anxious to secure one or more Canadian newsprint properties. It is stated that he already has a form of agreement with the Donohue Bros., who are operating the Murray Bay mill, formerly under control of Abitibi. The Great Lakes mill would fit in with the scheme, as it would be in a position to supply the Hearst papers in the mid-west. It might further be used as a weapon againts those manufacturers who have been strongly advocating a price increase. While corporate developments are not likely to be outstanding, there are still a number of situations which might arise to disturb the tenor of affairs. The price situation has remained relatively stable, but it is not as sound as might be desired. Little would be needed to upset the equilibrium of the market.

Notes and Jottings of the Trade

Wood fiber is gradually filling in the old Welland Canal, an inspection by Government officials and representatives of industries showed this week. The party, which toured the canal from Thorold to Port Dalhousie, found the channel gradually being filled in by waste from paper mills along the route. Solid bottom was in places nearly twelve feet below the muck which was left when the canal was drained for inspection.

Toronto Waste Paper Company, Ltd., has been granted Ontario incorporation with power to deal in waste paper. The capitalization is $40,000.

The United Paper Mills, which recently moved into new quarters on Wellington street, Toronto, have completed a very fine reception and sample room as part of their general offices.

Demand for Paper Normal for Season In Boston

While Local Paper Market Generally Continues Quiet to Fair, Business Shows Some Improvement Over Corresponding Period Last Year—Fine Writing Paper Manufacturers Report Increased Inquiries for Future Needs—Paper Stock Values Appreciate

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., July 15, 1935—Wholesale paper business in the Boston area was about normal for the time of year, quiet to fair, but on the whole regarded as better than a year ago at this time. At the New England office of a fine writing paper manufacturer, it was stated that orders were in about the same volume as the previous week, but that there are a few more inquiries. In wrapping paper lines there was a normal summer business. Box boards were in quiet to fair demand.

A number of grades of paper stock appreciated in value. Mixed papers and old newspapers remained firm at the same levels under old papers. No. 1 kraft advanced to 1.00 @ 1.05 from .90 @ .95. Bagging maintained its strong position. A considerable quantity of heavy wool tares and heavy baling bagging is being imported because of the scarcity. Heavy wool tares rose to 1.20 @ 1.35 from 1.10 @ 1.25 and heavy baling bagging to 1.50 @ 1.60 from 1.30 @ 1.35. Scrap sisal for shredding advanced to 1.20 @ 1.35 from 1.10 @ 1.25. New domestic rags continued at the same levels. There is only a small supply of old domestic rags on hand. With an increased demand from builders for roofing material and with a small supply of roofing stock, this commodity is very strong. The No. 3 grade of roofing stock has advanced to .90 from .65. In foreign rags, dark cottons rose to 1.35 @ 1.45 from 1.30 and old linsey garments to 1.90 from 1.75. A good fall business in paper stock is expected.

The twine business was very quiet. It is understood that department stores have not been buying a great deal lately, because of the feeling that prices would be lower, but it is stated that values will not decline.

Attacks Pooled Insurance Bill

Henry S. Dennison, president of the Dennison Manufacturing Company, Framingham, Mass., has attacked the pooled insurance bill recommended recently to the legislature by the majority of the special commission which studied the subject of unemployment insurance. In a statement, he said that when employers and workers realize the injustice to their interests in the bill they would oppose its passage. He favored the unemployment reserves bill filed by the minority of the commission. His statement is as follows:

"The community has a definite responsibility for taking care of people who are out of work when they have exhausted all other resources. It is no part of unemployment compensation legislation to relieve the community from that responsibility by calling for compulsory accumulations from the payrolls of employers and from pay envelopes of employees.

"Real social justice and intelligent business accounting speak loudly in favor of unemployment reserves as a clear, simple and business-like method of laying aside a proportion of the payroll under condition which will stimulate stabilizing the payroll and using the payroll tax of each individual business to take care of the unemployed originating from that business.

"The pooled insurance fund, whose possible constitutionality has been questioned, bolsters up bad management by letting money from well-managed plants pay unemployment benefits to the unfortunate unemployed coming from business organizations where no attention is paid to stabilizing and preventing unemployment at its source."

News of the Trade

Carter, Rice & Co., Corp., have sent to customers copies of the second mailing in the new advertising campaign of the Oxford Paper Company, Rumford, Me., whose offices are in New York City. The mailing piece is in the form of a twelve page booklet, "The Mind Needs Vitamins, Too," printed on Oxford English Finish Book. The booklet shows a number of the various possible treatments with this paper. The general theme of the booklet is to promote a greater use of direct mail advertising with suggestions for effective preparation. The mailing piece contains a discussion of typography, the most desirable types to use, and illustrations, including graphs.

The Groveton Paper Company, Groveton, N. H., which has a Boston office, has brought out a new mimeograph paper, stated to be one of the finest sheets on the market, in which the trade is very much interested.

The Wrapping Paper Division of the New England Paper Merchants Association held a meeting at the Boston Chamber of Commerce Tuesday. Robert E. Stone, vice-president in charge of wrapping paper, presided.

Percy D. Wells is passing a very enjoyable vacation at Cape Porpoise, Me.

William Steck, of Wm. Steck & Co., Inc., and William Ebner, of Darmstadt, Scott & Courtney, both paper stock dealers of New York City, called on the trade last week.

Japan To Exploit Manchurian Pulp

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—Reports of concessions to Japanese companies for the exploitation of Manchurian pulp have been current within the present year, according to reports from Trade Commissioner Paul P. Steintorf, Tokyo. These reports of concessions are conflicting and contradictory, however, and since none have been granted, no definite information is available at this time. It is understood that concessions will be granted to produce 60,000 to 120,000 tons of pulp annually. The military authorities are advocating the limiting of concessions to four of 10,000 tons each, in addition to the 20,000 tons to be turned out by the East Manchuria Pulp Company, but there is some agitation to increase the size of these concessions in order to produce on a more economic basis. It is planned to produce all varieties of pulp, including high grade sulphite for rayon production.

B. E. Prevost To Be Asst. Manager

HUDSON FALLS, N. Y., July 15, 1935—Announcement is made of the promotion of Bruno E. Prevost chief engineer of the Union Bag and Paper Company, to assistant manager of the paper division of the concern in this village. He will continue to maintain his duties as chief engineer. Mr. Prevost has been connected with the company for many years and is well qualified for his new duties.

Philadelphia Paper Market Continues Quiet

Demand for Fine and Coarse Paper Grades Restricted—Persistent Request, However, Experienced for Summer Specialties and Tissues—Board Mill Interest In Paper Stock Disappointing, Although Substantial Orders Are Expected Shortly

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., July 15, 1935—Both divisions of the paper trade—fine and coarse—continue to experience a lessening of business volume from a manufacturing and wholesale standpoint. However, summer specialties and allied lines, including tissues, are in good demand.

The anticipated activity in the waste paper market has not developed to the proportions which was expected by members of the trade here. The feeling in the trade is, as stated in these columns a week ago that the mills have considerable more purchasing to do and that demand will show substantial expansion over the next few weeks.

Floods Cause Damage

Whipped to fury by two days of almost continuous rain this past week, capped by cloudbursts which hammered its far-flung watershed, the Schuylkill River and its tributaries spread destruction very forcibly to the heart of Philadelphia causing the rich industrial section from Norristown, through Miquon to Manayunk and Frankford to virtually cease operations. The water-power of the Hamilton Paper Mills at Miquon, Container Corporation of America, and McDowell Paper Mills was cut off, causing a shutdown for just one day, when they resorted to steam power and resumed operation.

Workmen of the Container Corporation of America, located at Fountain and Nixon Streets, Manayunk, labored to fill a five-ton truck with merchandise from the mill; the water rose so rapidly that the truck could not be driven away before the water drowned out the motor. Shortly after, nothing but the roof of the cab of the vehicle was visible above the flooding river.

About $1200 worth of damage was caused in the Frankford Box Company, east of Erie avenue on Van Dyke street, and at a point about one mile west of the Delaware River. The first floor of the plant was inundated to a depth of 17 inches. All the machines except one were removed. It was under water and seriously damaged.

Henry Maier, Julius Maier and Martin Taylor, members of the firm, and Harry Sturn, manager, worked for more than an hour cleaning out the Little Tacony creek sewer inlet north of Erie avenue. Henry Maier declared that the damage which his firm suffered was due entirely to negligence on the city's part in keeping the sewer maintained in a condition where it could carry off flood water.

News of the Trade

What is known as "A Grand New Idea in Curtains" is displayed at the Dennison headquarters, Chestnut street at Tenth. These curtains are made of a processed paper and drape as gracefully as expensive fabrics. Miss Katherine Robbins, who is in charge of this department, told your correspondent that a home takes on a new personality with these gay new curtains. Every pair is standard length and of generous width. They will not sag or shrink; the colors are reasonably resistant to light fading and will not be injured by rain under normal use. They come in various styles, including the Priscilla—with or without ruffles; cottage sets—with tie-backs ready to hang. Then there are gaily colored side drapes of this processed paper, and it would take an expert to tell they were other than rich cretonne or chintz materials. In another department they are showing very attractive packets for picknickers and tourists. Among these is a packet containing a Scott towel and a wafer of soap; then there are Sani-covers for toilets, and disposable liners for baby's diapers.

The Penn Paper and Stock Company, established in 1903 by the late William J. McGarrity, and now operating waste paper packing plants in Philadelphia, Baltimore and Washington, is now occupying the Lear property.

There are several one and two-story modern factory-type buildings on this Lear property with an aggregate floor space of 200,000 square feet. They are built with skylight roofs and overhead traveling cranes. The largest unit will be equipped with conveyors, screens, dusting machines, dial scales and baling presses of the most improved type, and when all these installations have been completed, it will be one of the finest waste paper packing plants in the East. The other units will be used for storage, also for the assembling of sorted stock ready for shipment. There are private sidings to three railroads, the Pennsylvania, Reading, and Belt Line, with accommodations for fifty cars; also a dock will be available at which three barges can be loaded at one time. The acquisition of this property increases the handling capacity of the firm to 750 tons per day. This tonnage, the water and rail facilities, enable the Penn Paper and Stock Company to serve customers in the West as well as the East with a maximum of efficiency and dispatch. This new plant is really a concentration point through which a good deal of the tonnage handled by this company will henceforth be cleared. The waste paper department is under the direction of David Dixon, while William J. McGarrity, the son of the founder, devotes his time to the new paper end of the business.

Flames which swept a section of a warehouse of the West Jersey Paper Manufacturing Company, Elm Street and Delaware avenue, Camden, N. J., caused $25,000 damage, including the loss of a new $10,000 ten-ton truck. This is the second heavy fire damage suffered by this company in six years. On July 11, 1929, one of its warehouses and contents were destroyed at a loss of $65,000.

The Hopper Paper and Twine Company, 105 Church street, has recently been appointed agents in this territory for No. 1 sulphite bond made by Mount Holly Paper Company, Mount Holly Springs, Pa. It comes in white and five colors.

The will of the late Eugene K. Plumly, of 135 South 18th street, paper box manufacturer, has just been probated, and his $275,000 estate will be divided among his widow, Mrs. Mary Plumly, and three children. It was directed in his will, that Mrs. Plumly is to receive all his jewelry, personal effects and $5000 within ten days after his death. Mr. Plumly died June 23.

Norbert A. Considine, president of the Paper House of Pennsylvania, has just returned from New England, where he spent a week combining business with pleasure.

TAPPI Atlantic City Meeting to be One of Best

The Fall Meeting Program Committee of the Technical Association of the Pulp and Paper Industry, G. E. Landt, chairman, reports that the technical program for the fall convention is practically completed.

All the first day will be devoted to papers on the most recent developments in the Study of Cellulose Fundamentals. The second day will be devoted to general subjects, first, the Fundamentals of Sheet Formation, which will treat of the mechanics of sheet formation from the standpoint of engineering principles, and second, Fiber Properties as They Affect Sheet Formation. This will again be divided into sequences of discussion, all of which will be handled by recognized leaders in their particular field.

The technical program on the third day will consist of presentation of original work on paper making subjects. The present plan is to have five papers, details of which will be reported later.

As previously reported, the first day will be devoted to a symposium on "The Cellulose Fibre in its Relationship to Pulp and Paper Manufacture," a paper on the Morphology of the Cellulose Fiber, and one on the Colloidal Aspects of the Cellulose Fiber, and another on the Pulping Treatment and Fibre Properties will be read respectively by G. J. Ritter of the Forest Products Laboratory, Madison, Wis., Ben Rowland of the Institute of Paper Chemistry, Appleton, Wis. and G. A. Richter of the Brown Company, Berlin, N. H.

From this it will be seen that there is a logical sequence in the program in which the first day will be devoted to the latest thought in the study of cellulose fundamentals while the second day will be devoted to the discussion of the practical aspects of the subjects, while the third day will be set aside for consideration of recent important developments in various phases of papermaking.

Dr. Landt has also reported that for the final banquet of the Convention, his committee has been fortunate enough to secure as the principal speaker an able economist, not in the paper industry but nationally known. The fact that he is not in the paper industry will give added value to his address as it will give us that detached outside view point which is so valuable.

A Custom Made Convention

The members of the Delaware Valley Section of TAPPI are all members of various committees and they are all working with one objective, namely to make each member attending the TAPPI Fall Convention get as much valuable information, enjoyment and relaxation, out of the convention as it is possible.

Members attending the convention will find that the Delaware Valley Section members have worked out a good plan for seeing that each visitor is well cared for and will see that he reaches the mills or other points of interest and that he is entertained in the manner that best suits his individual taste. The members of all committees will see to it that a thoroughly interesting and enjoyable time will be had by all attending. A special effort will be made to make the stay of the ladies something long to be remembered.

Your Vacation at Atlantic City

Atlantic City in September is delightful. The weather is not too hot, and still it is warm enough, and bathing, fishing and sailing are at their very best. This is an unrivaled opportunity for combining one's vacation with attendance at the convention. What could be more instructive and more restful than a couple of days visiting the interesting places in Philadelphia, and then spending the rest of the vacation attending the convention and following that with a few days of rest at Atlantic City.

To the Ladies, God Bless Them!

For the ladies, one of the attractions will be a tour through the world famous John Wanamaker Store in Philadelphia, followed by a luncheon there, and then visits to points of historical interest in and around Philadelphia. One of the features of these visits will be that they will be made in small groups with sufficient local ladies as guides that they might almost be said to be individual tours.

At Atlantic City, arrangements have been made for a shore dinner for the ladies at one of the nationally known seafood restaurants. Arrangements have also been made for golf, bathing parties, indoor swimming meets, to say nothing of a bridge party for those who prefer that form of entertainment.

So far nothing has been said about those who want nothing but ease and rest, and for them, what could be pleasanter than a swinging sun seat on the beach, or a cool seat on the observation deck of the Ambassador Hotel, or a ride in a rolling chair for miles and miles of Atlantic City's boardwalk.

The first evening at Atlantic City will be devoted to a get-together sort of informal jamboree or dutch supper. It is guaranteed that no one can remain a stranger after that.

18 to 19 Holes of Golf

J. C. Dieffendorfer, Chairman of the men's entertainment committee, knowing that golf has always been one of the attractions of our conventions, has made the necessary arrangements with the Northfield course near Atlantic City. Enough members will have their cars so that the matter of transportation need not be an item of concern. Among other items on his schedule is a ball game on the beach which will be a memorable exposition of base ball as she should not be played. Mr. Dieffendorfer also promises the fresh water fishermen a thrill in deep sea fishing that they will not forget for a long time. All fresh water stories will hereafter be pale in comparison with the stories that will develop from this fishing excursion.

H. E. Baggs, the convention manager of the hotel, has reported that over 100 reservations had already been made for rooms during the period of the convention. Naturally, the best rooms will go to those making reservations early so it is suggested that members write promptly to Mr. Baggs at the Ambassador Hotel at Atlantic City being sure to mention that they are attending the TAPPI convention, as special prices are being made for one person from $3.00 to $6.00 per day, while for two persons rooms can be had ranging from $5.00 per day to $8.00 per day. The Ambassador Hotel will give these same rates for several days before and after the Convention. Those deciding to spend their vacations at Atlantic City will save considerable by taking advantage of these rates which are considerably below the regular rates.

It is not necessary to be a TAPPI member to attend the great pulp and paper meeting at Atlantic City. Anyone wishing to attend will be welcome.

Pollutional Waste Survey of Wisconsin Pulp and Paper Mills*

J. M. Holderby[1] and L. F. Warrick[2]

With the cooperation and endorsement of the Advisory Committee on Waste Disposal of the Wisconsin Pulp and Paper Industry, the Bureau of Sanitary Engineering has, during the past year, continued studies leading toward the desired end of minimizing pulp and paper wastes as factors in stream pollution.

These studies have been made to follow up similar work carried out in 1926, 1929, 1931 and each year thereafter. *(1) (2) (3((4).* Individual reports and recommendations, together with a blueprint chart summarizing the data collected, have been sent to each mill concerned. The present report discusses the studies as a whole and compares current findings with those of previous years.

* Report on Studies of Pulp and Paper Mill Wastes made during 1934 by the Bureau of Sanitary Engineering, Wisconsin State Board of Health, in cooperation with the Wisconsin Pulp and Paper Industry.

[1] Assistant Sanitary Engineer, Wisconsin State Board of Health, Madison, Wis.

[2] State Sanitary Engineer, Wisconsin State Board of Health, Madison, Wis.

Field Procedures

At each mill conferences were held with officials, results of previous studies were discussed and arrangements were made for the collection of the desired samples and flow data by the mill staff.

At each mill two sets of samples were collected, one a 24-hour composite, and the other a composite collected over a period of one week's mill operation, usually from 4 to 6 days. The 24-hour samples were shipped immediately to the State Laboratory of Hygiene and used for determining biochemical oxygen demand, while the week's composites were preserved with chloroform and were used for all determinations other than the biochemical oxygen demand test. Detailed information relative to the mill production and the sewer discharges during the test period were submitted with the samples.

TABLE I.—PULP AND PAPER MILL WASTE STUDIES—COMPARISON OF RESULTS FROM IDENTICAL MILLS 1931-1934

	Waste Flow in Thousand Gallons per Ton				Fiber Lost to Sewer Per Cent of Production				Pollution Value * Population Equivalent Persons per Ton			Financial Loss Index Dollars per Ave. Day			
	1931	1932	1933	1934	1931	1932	1933	1934	1931	1932	1934	1931	1932	1933	1934
‡ PAPER MILLS															
1	30.4	19.6	25.1	27.0	2.3	1.5	2.0	2.6	25.8	17.6	11.4	44.27	28.31	37.43	49.31
2	21.1	29.9	5.6	4.7	3.5	6.0	0.3	0.7	13.2	26.9	4.8	133.60	229.93	11.59	27.07
3	102.4	102.0	112.6	67.4	2.7	2.7	1.8	0.9	16.8	36.7	76.8	31.60	35.84	23.76	12.47
4	8.2	22.7	15.1	10.2	1.3	3.1	1.9	0.9	3.2	39.0	7.2	35.96	87.42	58.83	25.10
5	27.5	20.8	28.1	38.4	3.5	2.6	4.6	10 8	11.4	14.1	13.8	92.80	67.38	120.16	283.07
6	59.1	13.4	66.7	56.8	1.4	0.8	1.2	2.5	24.6	9.0	48.6	15.80	9.06	14.08	47.22
7	82.9	69.8	22.9	14.0	5.3	9.5	1.1	4.5	59.9	100.9	6.0	69.60	125.80	17.22	73.96
8	116.7	100.2	93.9	83.1	6.3	2.6	3.3	5.1	79.0	26.9	63.0	47.80	19.84	24.80	48.08
9	1.3	1.3	16.3	12.5	0.01	0.02	1.1	0 8	0.9	0.5	16.2	0.73	1.09	76.80	56.78
10	48.4	55.5	26.8	39.9	5.2	5.7	0.4	4.0	37.7	79.7	40.8	99.00	67.15	8.17	76.57
11	13.3	8.7	12.9	10.6	0.6	0.45	0.22	0.6	3.6	3.1	2.4	22.80	17.62	8.51	24.75
12	53.4	85.1	70.4	48.0	4.3	2.2	0.5	1.9	5.4	35.7	16.8	29.20	14.79	3.33	12.76
13	64.7	60.5	67.5	50.7	6.7	5.9	4.3	2 2	58.1	155.5	158.4	48.40	44.61	32.34	16.76
14	17.9	19.5	22.2	27.2	2.6	2.2	1.2	4.3	51.5	29.2	19.2	129.20	108.97	58.29	211.43
15	10.9	8.8	12.8	20.9	2.3	0.9	1.3	2.7	7.2	6 3	15.0	68.80	30.00	44.54	90.69
16	39.2	35.9	3.1	26.4	3.0	2.1	0.02	0.4	18.6	6.6	15.6	12.00	8.46	0.08	1.74
17	31.2	4.3	15.5	22.1	2.1	0.3	2.4	1.0	41.3	3.1	26.4	88.40	14.14	98.18	41.18
18	18.5	17.4	22.2	14.4	2.9	0.5	0.7	1.4	31.1	8.4	21.6	22.85	3.57	5.59	10.71
19	11.7	18.8	27.8	37.8	2.8	4.1	3.6	4.8	10.8	28.7	26.4	106.40	154.72	133.67	117.07
20	19.6	8.5	20.4	14.7	3.9	1.3	4.9	3.5	50.9	21.9	10.8	109.60	32.36	122.64	85.81
21	35.7	22.7	35.2	43.9	4.2	1.5	3.6	7.5	48.5	17.2	45.6	53.60	18.88	45.69	94.55
Average	38.9	34.5	34.4	31.9	3.2	2.7	1.9	3.0	28.6	31.8	30.8	60.12	53.33	45.03	57.01
‡‡ SULPHITE PULP															
1	71.5	70.4	67.3	104.3	2.5	6.5	2.4	4.7	1382	1468	1079	68.80	175.23	64.80	161.94
2	64.3	23.2	55.8	48.2	9.9	2.4	1.0	1.3	2290	1227	1483	96.40	26.89	10.85	16.46
3	35.9	36.0	42.2	54.2	1.8	1.4	2.2	2 6	1255	1157	1905	57.20	44.87	72.25	83.75
4	49.1	48.0	52.6	47.7	11.2	1.1	1.3	3.1	2772	1480	16.48	384.00	38.87	44.29	105.51
5	117.8	59.2	65.1	73.4	17.8	2.3	2.5	5.0	6763	1483	1703	642.40	82.08	88.38	180.18
6	46.9	25.4	41.6	4.5	12.3	1.7	1.0	0.4	3966	490	896	160.00	22.40	12.73	7.23
7	36.9	13.4	23.1	20.9	3.2	1.8	0.9	1.2	1903	2560	1153	97.60	51.12	25.63	35.71
8	80.0	57.3	54.3	67.5	16.1	4.5	2.6	2.3	2064	1259	1667	376.80	106.55	60.65	54.76
9	120.6	87.5	30.9	43.5	5.5	2.2	1.5	1.6	1844	1953	1702	98.80	38.79	26.73	28.26
10	225.6	161.0	98.3	95.1	25.4	3.9	2.7	8.8	2077	698	1871	243.20	37.68	25.82	84.53
Average	84.9	58.1	53.1	55.9	10.6	2.8	1.8	3.1	2630	1378	1511	222.52	62.45	43.21	75.83
‡‡ GROUNDWOOD PULP															
1	7.1	23.4	8.6	13.8	1.7	8.1	1.7	4.0	6.6	79.1	21.0	16.10	76.59	4.79	11.33
2	28.1	3.5	42.4	33.2	1.3	0.6	3.1	2.9	23.4	9.0	...	6.00	2.72	14.81	13.66
3	27.0	22.8	1.5	0.4	1.5	2.5	0.2	0.1	32.3	40.8	0.6	8.25	13.36	1.19	0.43
Average	20.7	16.6	17.5	15.8	1.5	3.7	1.7	2.3	20.8	43.0	10.8	10.12	30.89	6.93	8.47
‡ MISCELLANEOUS															
1	25.6	22.5	21.9	26.6	2.5	2.6	3.4	4.2	19.2	31.2	16.8	75.25	79.50	104.36	129.37
2	19.8	15.5	13.3	14.1	3.9	4.1	1.9	2.2	15.0	17.7	12.6	29.00	30.97	14.40	16.50
3	27.9	27.8	35.0	55.0	5.1	4.1	4.3	7.0	259.9	102.0	203.4	126.00	100.56	107.01	173.72
4	38.2	33.7	28.4	27.2	4.7	2.5	2.8	1.9	53.9	51.6	83.4	132.20	70.50	78.82	54.71
5	25.9	30.0	18.3	18.6	10.5	5.1	9.6	0.5	38.9	50.3	18.6	34.00	16.41	31.12	1.60
6	134.4	142.5	126.5	135.9	10.5	9.1	8.1	8.6	731.7	279.6	264.6	309.00	258.09	229.85	245.81
Average	45.3	45.3	40.6	46.2	6.2	4.6	5.0	4.1	186.4	88.7	99.9	117.58	92.66	94.26	103.62
GRAND AVERAGE															
40	50.0	40.7	38.8	38.9	5.4	3.1	2.3	3.1	701.9	377.6	409.4	105.59	59.83	49.10	70.31

‡ Based on paper production. ‡‡ Based on pulp production.

* Population Equivalent = $\frac{\text{5 Day Biochemical Oxygen Demand (in pounds per ton)}}{0.167}$

Weirs were used in most cases for the estimation of flows. In sewers inaccessible or unsuitable for weir installation flows were estimated from current meter measurements, Pitot tube traverses, or consistency determinations.

Samples were taken and flow measurements were made at intervals of from 2 minutes to 2 hours, according to the nature of the waste. Wastes which were relatively constant as regard solids content were sampled without regard to quantity of flow at time of collection. Others were "weighted" according to discharge.

Laboratory Procedure

Composite samples were shipped to the State Laboratory of Hygiene, where determinations were made for total and suspended solids, both fixed and volatile; pH, oxygen consumed and 5 day biochemical oxygen demand. Analytical methods have been described and the interpretation of analytical results have been discussed in previous reports. *(3) (4)*

Precision of Data

It is believed that for most of the mills the data collected represents rather well the actual sewer losses during the period of the test. In some few cases, however, adequate samples and flow measurements and occasionally complete production records were not obtained. While it is to be regretted this occasional lack of cooperation has resulted in some obviously erroneous data, worth little either to the mills concerned or to these studies, it is believed that the picture presented by the data as a whole is reasonably accurate.

Results

Table I summarizes data from the 1931-32-33 and 34 studies for identical mills from which reasonably reliable data are available and at which survey procedures have varied little during the four year period.

In Table I are shown data which will permit direct comparison between mills and a figure termed the financial loss index, which represents the value of the fiber lost through the sewers. This index is dependent upon the grade of product manufactured and the tonnage produced, and does not, therefore, indicate relative efficiencies.

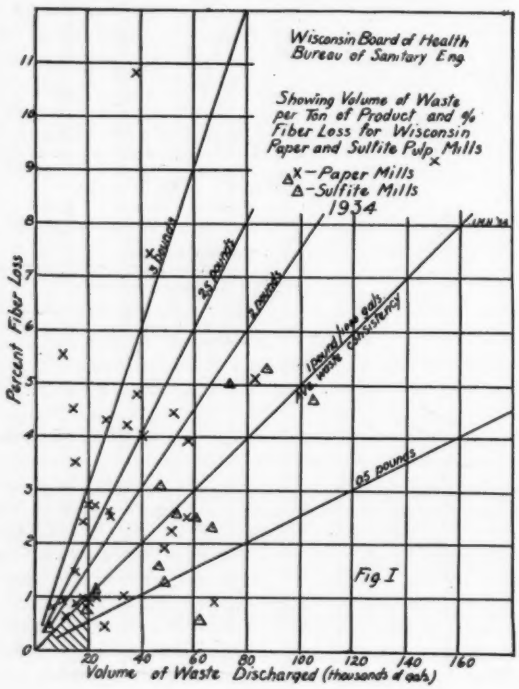
Wisconsin Board of Health
Bureau of Sanitary Eng
Showing Volume of Waste per Ton of Product and % Fiber Loss for Wisconsin Paper and Sulfite Pulp Mills
X – Paper Mills
Δ – Sulfite Mills
1934
Percent Fiber Loss
Volume of Waste Discharged (thousands of gals)
Fig I

FIG. 1

The monetary values of fiber lost to the sewers were assumed for the purpose of comparison to be the same as were used in previous reports. These values are given in Table II.

TABLE II

VALUE OF FIBER CARRIED BY WHITEWATER

Classification of Mill Product	Value of Whitewater Fiber—Per Ton
Book, wrapping and sulphite bond papers	$40.00
News and unclassified	25.00
Rag content bonds	60.00
Straw and paper board	20.00
Sulphite and kraft pulp	40.00
Groundwood pulp	15.00

Values shown in Table II may not apply strictly under prevailing market conditions. Individual mills can, however, adjust reported indices to fit their own present costs.

The population equivalents of the mill wastes indicate the number of persons who by the production of domestic sewage would exert an oxygen demand on the stream equivalent to that of the wastes from the manufacture of one bone dry ton of the mill product. These equivalents are based upon the commonly accepted assumption that one person will in one day produce sewage with a 5-day oxygen demand of 0.167 pounds.

Discussion

From the mill operator's standpoint, perhaps the most important single conclusion to be drawn from a study of Table I is that, following several years of steady decrease, the average fiber losses from the forty mills included have increased materially. This increase is contributed by three of the four classifications and if Mill No. 5 in the Miscellaneous group were to be excluded the fourth classification would show an increase also.

Volumes of waste per ton of product are noted to be somewhat lower for the paper and ground mills and a little higher for the other two; averaging for these mills almost exactly the same as in 1933.

Individual financial losses increase, of course, with increased fiber losses. This is not necessarily true, however, of the average financial index because of the facts that different unit values are assigned the losses from the various mills, and that all mills do not have the same weight in calculating the index. In Table I we find that the average index increased materially this year for all classifications as well as for the group as a whole.

The exact causes of the increased fiber losses this year are rather hard to determine. A few of the mills have altered their processes somewhat, and as a result have shown slightly increased losses. The total number of mills showing increases, however, greatly outnumber the ones that fall in this category. It is probable that the generally higher fiber losses are a result of several conditions, among which are (1) an ever increasing tendency for Wisconsin paper mills to go into specialty production, (2) the clamor for high quality in finished products making some superintendents unduly suspicious of white water reuse, and (3) the breaking in of a fourth shift of operators following the establishment of the six hour working day in the Wisconsin industry.

Of the above three suggested causes for increased losses in the industry the first and third are probably difficult to overcome until such time as adjustments can be made. Specialty production calls for short runs and frequent clean-ups, and with systems designed for long runs such operation invariably results in high stock losses. Breaking in an extra shift of operators also tends to increase

TABLE III

DISTRIBUTION OF PAPER AND SULPHITE MILLS ON BASIS OF FIBER LOSS AND WASTE FLOW—1934

Fibre Loss Range of Loss	No. Mills	%	Waste Flow/Ton Range of Volume	No. Mills	%
PAPER MILLS					
0.0%-1.0% ...	10	32.3	0 gal.- 20,000 gal.	10	32.3
1.1 -2.0 ...	2	6.4	20,0 0- 40,000 gal.	12	38.7
2.1 -3.0 ...	7	22.6	40,001- 60,000 gal.	6	10.4
3.1 -4.0 ...	3	9.7	60,001- 80,000 gal.	1	3.2
4.1 -5.0 ...	4	12.9	80,001-100,000 gal.	1	3.2
5.1 and over..	5	16.1	100,001 and over gal.	1	3.2
Total	31	100.0	Total	31	100.0
SULPHITE MILLS					
0.0%-1.0% ...	3	21.4	0 gal.- 20,000 gal.	2	14.3
1.1 -2.0 ...	3	21.4	20,001- 40,000 gal.	1	7.1
2.1 -3.0 ...	1	21.4	40,001- 60,000 gal.	4	28.6
3.1 -4.0 ...	1	7.1	60,001- 80,000 gal.	4	28.6
4.1 -5.0 ...	1	7.1	80,001-100,000 gal.	2	14.3
5.1 and over..	3	21.4	100,001 and over gal.	1.	7.1
Total	14	99.8	Total	14	100.0

waste due to temporarily less efficiency in operation. The suspicion with which certain superintendents regard the influence of white water reuse on the quality of the finished product, however, is ordinarily not justifiable. Most of the mills in which this suspicion is rampant have highly successful competitors who are reusing white water to the limit.

Average population equivalents for paper mills over the four year period, shown in Table I, check very closely. This would indicate that the oxygen requirements of paper mill wastes depend somewhat less on fiber content than on the amount of dissolved material present. It is pointed out, however, that paper fiber itself is objectionable in streams because of certain characteristics in addition to its oxygen demand. The majority of the pollutional strength of sulphite pulp wastes being due to lignin, carbohydrates, etc. extracted from wood by the acid cooking process one would not expect a correlation between fiber content and population equivalent for these wastes. From the data shown it is reasonable to assume that the waste from one ton of sulphite pulp is equivalent to the domestic sewage from approximately 1500 persons. In the groundwood group pollutional strength seems to vary directly with fiber losses. This is logical, considering the fact that very little of the non-cellulosic material in the wood is separated from the fiber.

It is believed that the data collected in the course of these studies bears out the contention that most any paper mill can operate with a fiber loss to the sewer not exceeding 1 per cent and a waste flow of 20,000 gallons or less per ton of finished product. It is further believed that the 1 per cent fiber loss limitation can well be applied to sulphite and possibly other pulp mills if wood room wastes are excluded. Table III and Fig. 1 indicate the

FIG. 2

Specialty mills frequently need savealls on sewer outlets to reduce pollution occasioned by frequent cleaning up of the whitewater systems.

FIG. 3

Ponding and aeration of sulphite waste liquor has been tried as a temporary expedient in reducing pollution pending development of a practical recovery process for this strong waste.

distribution of the paper and sulphite mills included in the 1934 studies on the basis of fiber loss and unit waste production.

This table shows that 10 paper mills, almost one-third of the total number, are within the 1 per cent limitation; that the same number of paper mills are within the 20,000 gallons per ton class; and that 3 out of 14 sulphite pulp mills have fiber losses of 1 per cent or less, with 6 others under 3 per cent. It is proposed to establish as an objective for these studies the reduction of fiber losses from all wood pulp and paper mills to 1 per cent or less.

The problem of utilizing sulphite waste liquor and thus eliminating it as a source of gross stream pollution has received considerable attention, and a great many treatment processes have been investigated commercially. At least one of these, a process the end products of which can profitably be reused back in the manufacture of sulphite pulp, has yielded very encouraging results and prospects for the early construction of a full-scale demonstration unit are reported to be very good. Tests made indicate that this process will reduce the pollutional strength of the wastes at least 75 per cent. Following the establishment of a practical and economical recovery or treatment process mills will undoubtedly be expected to remove untreated sulphite liquor from the streams of the state.

It may be stated in concluding that the increased average fiber losses shown by the 1934 studies were largely due to conditions which better organization within the mills as well as modifications and improvements in waste recovery procedures should eradicate; and that the increased number of mills operating with fiber losses of 1 per cent or less further demonstrates the feasibility of the substantially "closed" white water system.

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(3) Holderby, J. M., Paper Trade J. 96, No. 14: 17-19 (April 6, 1933).
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L. J. Parant Visits Finch, Pruyn & Co.

[FROM OUR REGULAR CORRESPONDENT]

GLENS FALLS, N. Y., July 13, 1935—L. J. Parant, vice-president and general manager of the St. Croix Paper Company of Woodland, Me., accompanied by H. L. Hayes, plant engineer, and T. W. Whittier, an engineer identified with the George F. Hardy concern, are in this city inspecting the ground wood mill of Finch, Pruyn & Co. Plans are under way for installing equipment in the St. Croix plant similar to the machinery used by the local concern. The group are expected to stay here several days.

To Install Beloit Cylinder at Federal

ST. LOUIS, Mo., July 18, 1935—A substantial evidence of improved feeling in certain manufacturing centers is contained in the forthcoming new unit of the Alton Boxboard and Paper Company at Federal, Ill. This progressive corporation has decided upon the installation of an additional paper machine and this week placed the contracts for this equipment.

The addition to the Alton plant will consist of a new mill to house a modern machine with a capacity of 100 tons of straw board per 24 hours. The paper machine, which is special in every sense, will be built by the Beloit Iron Works at Beloit, Wis., and unlike other straw board machines this one will have two making cylinders. The beater equipment for which contracts have been awarded to the Dilts Machine Works, Inc., of Fulton, N. Y., will consist of two special iron tub beaters of large capacity for straw, each beater to be equipped with three new designed deckle type cylinder washers.

The building plans include the erection of a room at the end of the present rotary room in which to house a washer of entirely new design from which the stock will be handled by a low head pump of high capacity to the two Dilts beaters.

The Alton Boxboard mill already is equipped with two paper machines one of 108 inches width and one of 145 inches width and the new machine when installed will make the Alton plant one of the most modern equipped board and straw mills in operation. The new machine will nicely round out their present line of high grade boxboards.

The plant is in charge of Roy Breyfogle, who is general superintendent and who is largely responsible for the layout and design of the new equipment many details of which are strikingly original. G. G. Otto is general manager of the plant, and the active operation of the mill and the necessity of the increased capacity speaks volumes for the quality of the product and the successful handling of the manufacturing and business end of the enterprise.

Work has been actively commenced at the plant and foundations laid for the new buildings. It is expected the equipment will be completely installed ready for operation by early January.

Indianapolis Demand Improves

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 15, 1935—Business in better grades of paper seemed to pick up slightly during the last week. The improvement was said to be particularly noticeable when compared with the same time last month. In fact the first half of this month has been materially better than the first half of last month, the entire month being rather dull. Local paper jobbers say there appears to be quite a bit of direct by mail advertising ready to be put out, some of it already being under way. The demand for covers and book papers also seems to be improving. Prices are being held firm and the expressed fears that with abolition of the NRA that prices might be slashed, seem to be groundless. However, it is evident that the users, particularly of better grades, are expecting some price declines, for there is quite a bit of shopping around for the lowest price and the users are buying only what is necessary for current use.

Due to successive heat waves, the demand for summer specialties has jumped again. The demand seems to cover the entire list. Towels, napkins, plates, cups and all similar merchandise is moving rapidly. Here again there is a tendency to buy only in small lots and for immediate needs, but the orders are numerous and prices are being held in nice shape. Tissues also are reported to be moving actively. The summer specialty trade was slow in getting started due to weather conditions but now is making up for a lot of lost time.

Box manufacturers report little change in their trade. There has been a lull in demand from the automobile accessory trade, but other consumers are in the market. A little later in the summer there is expected to be an improvement in demand from the candy trade. Indications now are that these buyers will be better consumers than they were last year. Demand for paper bags and wrapping paper is reported good for this time of the year. Quite a bit of merchandise is being sold to the cleaning trade.

The paper stock situation is unchanged. There is a dull mill demand and paying prices are reported lower than satisfactory.

Champion To Expand Water Supply

[FROM OUR REGULAR CORRESPONDENT]

HAMILTON, Ohio, July 15, 1935—A proposal to rent, lease or purchase the present city water wells and equipment, which will be abandoned on September 1 when the new municipal supply system will be completed, was made to city council Wednesday night in a communication from Alexander Thomson, as president of the Champion Coated Paper Company.

Faced by the necessity of acquiring a more adequate water supply to augment its present wells, the Champion Coated Paper Company, is casting about for a new field. Mr. Thomson informed council that the need for additional water is urgent at this time and stated that the old city well fields will provide the solution.

The Champion Coated Paper Company uses from 16,000,000 to 18,000,000 gallons of water a day of which 6,000,000 to 7,000,000 gallons a day are pumped from deep wells and the remainder is drawn from the Miami river and filtered.

Bermingham & Prosser's Peacock Calendar

The Bermingham & Prosser Company, of Chicago is just sending out a rather unique calendar entitled Great Men of History. The announcement says, "This year we present the Peacock Hall of Fame . . . The Great Men of the Ages stride across the pages of this, our Seventh Peacock calendar of inspiration to bring you New Hope, New Faith and New Courage . . . May it also be a reminder that in the Hall of Fame of Quality Enamels . . . at the price of Peacock, Peacock has no equal."

The calendar starts with July 1935. It is bound with spiral wire and is an unusually attractive piece of printed matter that will undoubtedly find a prominent place in many offices.

NRA to Survey Paper Industry

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—A study or survey of the paper industry will be made by NRA it has become known in connection with a number of such inquiries to be made of basic industries. E. C. Popp of the Research & Planning Division will be in charge of the survey. Details are not yet available.

Robert Gair Co. Moves New England Office

Removal of the New England sales offices of Robert Gair Company, Inc., and subsidiaries on July 15, to 77 Summer street, Boston, Mass., telephone, Liberty 5125-6, has just been announced by Arthur J. Wallace, manager.

DOWNINGTOWN

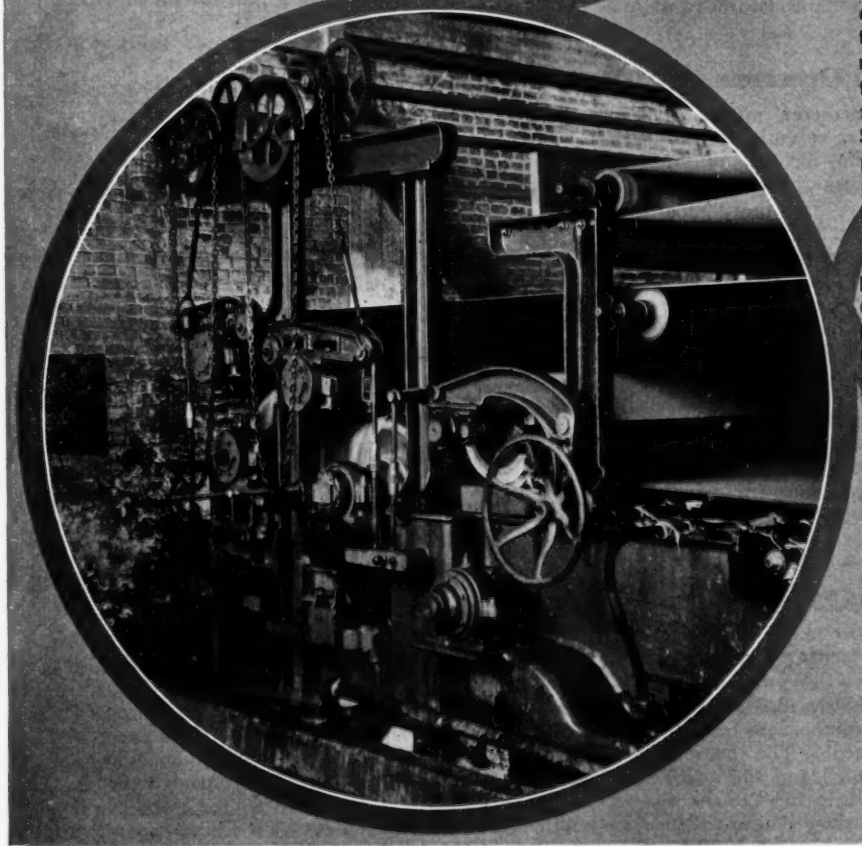
Patented

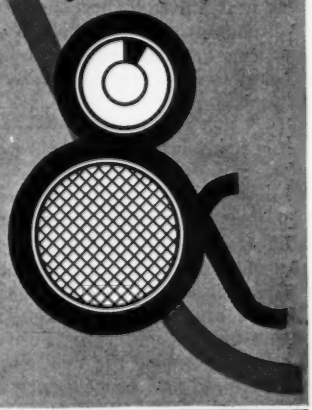
Extractors and Duo-Dehydration are covered by Downingtown Patents Nos. as follows: 1,996,661 — 1,992,713 RE19,521—1,935,837— 1,991,346 — 1,934,543 1,911,310 — 1,998,046.

New Vat Added by Duo-Dehydration

Negligible Increase in Power

Safe, economical water removal provided by Duo-Dehydration permitted the modernization of this machine at minimum cost. The two Extractor Units require no drive, no pump and no motor to drive the pump, all of which would have been needed had a Suction Drum Roll been used; the Suction Felt Roll requires no drive and takes only one-tenth the power absorbed by the drag of flat boxes; the Suction Primary Press that replaced the battery of small primaries uses the same drive and only a 35 H. P. motor on the pump . . . We build Suction Couch Rolls, Suction Press Rolls, Suction Drum Rolls, Felt Cleaning Suction Rolls and Extractor Units . . . Consult us before making Wet End changes on any machine . . . The Downingtown Mfg. Co., Downingtown, Pennsylvania.





No Board Machine is Modern *Without* DUO-DEHYDRATION

I. P. & P. Co. of Newfoundland Report

Archibald R. Graustein, president, in making his annual report for 1934 to shareholders of the International Power and Paper Company of Newfoundland, Ltd., says:

"Operations during 1934 resulted in a net loss of $263,169 after all charges as compared with a loss of $169,046 in 1933.

"Physical volume of business showed some increase—165,486 tons in 1934 as compared to 162,394 tons in 1933—but gross revenues declined approximately $375,000 as a result of lower average selling prices. The low price of $40 a ton net delivered at New York and Chicago, to which newsprint declined on April 1, 1933, remained in effect throughout 1934. Lower values for the United States dollar resulted in a loss of $59,360 in exchange for the company in 1934 as compared with a profit of $436.375 in 1933. The adverse effect of these items was offset to a large extent by a large net reduction in cost of sales and expenses and some decline in interest charges.

"During the year funded debt to the equivalent of $134,389 was retired and debt to affiliated companies was reduced by $898,667 but the secured bank loan increased by $950,000.

"The government owned Newfoundland railway has just completed new warehouse and dock facilities at Port aux Basques which is the southernmost port on the west coast of Newfoundland and is open to navigation at all seasons. The company has leased these new facilities for a ten-year period with right of renewal and is now able to continue shipments of newsprint during winter months when the harbor at Corner Brook is closed by ice. In previous years it has always been necessary to build up large stocks of newsprint in storage, both at the mill and at delivery points, in order to maintain continuity of production and deliveries."

B. C. Mill May Operate

According to word from Vancouver, affairs of Vancouver Kraft Company, which have recently been in litigation, may become more settled following a coming meeting of the company which will discuss the proposal of the trustee, National Trust Company, that the company go into receivership. Vancouver Kraft Company is an F. W. Leadbetter enterprise, organized some years before the business slump in 1929 and which, because of that slump and the subsequent decline in pulp prices, never operated. The mill, almost fully equipped, is located in Howe Sound. British Columbia Supreme Court last month called a meeting of bondholders to deal with the receivership proposal, and the meeting went on record as favoring an extention of time. The company defaulted on its bond interest and sinking fund requirements on May 31, 1931. Mr. Leadbetter in a letter to shareholders contends that conditions are becoming more propitious for opening the mill and that receivership now would be particularly unfortunate.

New Features in Magnetic Clutch

A newly designed general purpose magnetic clutch, with a number of important improvements, is announced by Cutler-Hammer, Inc., 291 12th street, Milwaukee, Wis.

An outstanding feature of the new clutch is the method of adjusting the friction faces to compensate for wear and to assure uniform lining engagement. The inner circumference of the field ring is threaded and the adjustment is made by rotating the field ring, in respect to the magnet field member, and consequently moving it toward the friction surface on the armature member. When the field ring has been moved forward sufficiently to compensate for the wear, it is locked firmly in position.

A floating magnet armature is used in the design of the new clutch, making it impossible to score the magnet pole faces even if proper adjustment on the lining is not maintained. This feature overcomes the disadvantage of the conventional single friction face clutches, on which grooving and scoring of the magnet poles results from improper maintenance of lining adjustment.

Other features of the new design include a magnet coil which may be readily removed and replaced as a unit, rugged bronze collector rings, a lining wear indicator, and a pilot bearing to insure concentric engagement of the two members.

Bulletin 522, which describes these new features in detail, will gladly be sent on request by the manufacturer.

Weekly Production Ratio Report

Reports to the American Paper and Pulp Association show the following Over-All Production Ratios for the designated periods.

	Reporting Mills		Total Production
	Number	Capacity	Ratio
September, 1934	292–299	.....	59.4%
October, 1934	297–394	.....	64.7%
November, 1934	385–399	.....	61.7%
December, 1934 (a)	396–404	.....	62.1%
January, 1935	397–411	.....	65.8%
February, 1935	407–409	.....	70.0%
March, 1935	406–408	.....	70.5%
April, 1935	405–407	.....	70.0%
May, 1935	375–407	.....	69.4%
*Week ending June 8, 1935	373	150,868	70.5%
*Week ending June 15, 1935	368	148,229	71.1%
*Week ending June 22, 1935	355	145,870	72.9%
*Week ending June 29, 1935	333	140,142	72.6%
*Week ending July 6, 1935 (b)	253	84,883	52.9%

(a) Capacity and percentage data exclude December 25, 1934.
(b) Capacity and percentage data exclude July 4, 1935.

Statistics showing the number of mills reporting by ratio groups are given below:

	Number of Mills Reporting — Week ending				
Ratio Limits	June 8, 1935	June 15, 1935	June 22, 1935	June 29, 1935	July 6, 1935
0% to 50%	124	119	112	98	142
51% to 100%	249	249	243	235	111

* Subject to revision.

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours" were as follows:

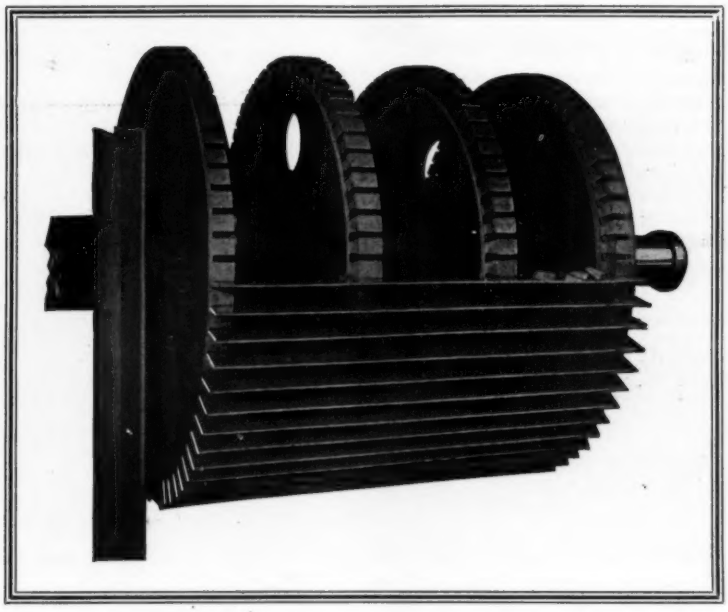
	September, 1934	62 per cent
	October, 1934	63 per cent
	November, 1934	56 per cent
(a)	December, 1934	53 per cent
	January, 1935	61 per cent
	February, 1935	67 per cent
	March, 1935	67 per cent
	April, 1935	61 per cent
	May 4, 1935	61 per cent
	May 11, 1935	61 per cent
	May 18, 1935	59 per cent
	May 25, 1935	61 per cent
	June 1, 1935	57 per cent
	June 8, 1935	61 per cent
	June 15, 1935	65 per cent
	June 22, 1935	65 per cent
	June 29, 1935	69 per cent
	July 6, 1935	39 per cent

Revised statistics covering delinquent mill returns will be shown in later reports.

Kalamazoo Men Go To Wisconsin

Kalamazoo, Mich., July 15, 1935.—Hazen H. Dilno, formerly purchasing agent for the Kalamazoo Stationery Company, and Jesse F. Keville, sales manager of the school specialties products of the Kalamazoo Vegetable Parchment Company, will leave shortly for Port Edwards, Wis., where they will take charge of a school specialty and tablet branch at the Nekoosa-Edwards Paper Company.

Criticism—



Criticism of beater rolls does not apply to the Dilts patented keyed Bandless type. There is no endwise driving of the bars; no loose fits or worn slots. There are no expensive special shaped bars, and the bars can be purchased from any Dilts licensed manufacturer. Of course there are no bands (or rings) to burst or work loose. The shaft is forged steel, the spiders are cast steel.

Every fly bar has a perfect fit at four points in its length; every fit is independent of every other fit. Any bar, or any number of bars can be removed and replaced without disturbing any other bar and without removing the roll from its bearings. The bars can be removed and replaced rapidly and without the need of any experienced or high-priced labor. More than one thousand Dilts bandless rolls have been built. There is nothing about them to criticize.

—Dilts—

MACHINE WORKS Inc. FULTON, N.Y.

"Your Paper is Made in Your Beaters"

TAPPI FALL MEETING
PHILADELPHIA—ATLANTIC CITY
SEPT. 18-21

German Exports of Paper Register Decline

German export trade in paper of all kinds registered an appreciable decline during 1934 compared with the preceding year, according to a report from Vice Consul James H. Wright, Cologne, made public by the Commerce Department.

Total foreign sales in the past year aggregated 127,776,000 reichsmarks against 146,409,000 reichsmarks during 1933. This recession in the paper export trade, it is pointed out, is of interest in view of the fact that domestic sales of paper during 1934 were in general on the up-grade. Decreases occurred in by far the greater number of export classifications, the only noteworthy increase being in the case of photographic paper.

Great Britain was the largest outlet for German exports of pasteboard of all kinds, except glazed and leather board, wrapping paper, box paper, rough wall paper and miscellaneous paper goods. The United States was the chief buyer of gelatine paper and drawing paper in the year under review. France and the Netherlands absorbed about 40 per cent of German foreign sales of printing paper, while the best customers for writing paper were the Netherlands, Argentina and Great Britain, the report states.

June Newsprint Statistics

Production of newsprint in Canada during June, 1935, amounted to 232,020 tons and shipments to 228,196 tons, according to the Newsprint Service Bureau. Production in the United States was 77,339 tons and shipments 76,985 tons, making a total United States and Canadian newsprint production of 309,359 tons and shipments of 305,181 tons. During June, 27,559 tons of newsprint were made in Newfoundland and 1,683 tons in Mexico, so that the total North American production for the month amounted to 338,601 tons. Total production in June, 1934, was 343,583 tons.

The Canadian mills produced 21,610 tons more in the first six months of 1935 than in the first six months of 1934, which was an increase of 2 per cent. The output in the United States was 29,291 tons or 6 per cent less than for the first six months of 1934, in Newfoundland 10,191 tons or 7 per cent more and in Mexico 750 tons more, making a total increase of 3,260 tons, or two tenths of one per cent.

Stocks of newsprint paper at Canadian mills were reported at 57,771 tons at the end of June and at United States mills 16,496, tons, making a combined total of 74,267 tons compared with 70,089 tons on May 31, 1935.

William Stephen Taylor Dead

KALAMAZOO, Mich., July 15, 1935.—William Stephen Taylor, aged 79, died at the home of his son here on Friday, July 12. He was a resident of Kalamazoo for six years, previously having lived in Appleton, Wis., where for thirty years he was manager of the Pulpwood Company of that city.

Mr. Taylor was a native of New York State where he was born in November 1857. He was a member of the Masonic bodies at Appleton and a member of the Shrine at Milwaukee.

Surviving him are five sons, L. E. Taylor, a traveling representative for the Sutherland Paper Company, Kalamazoo; Chas. W. Taylor, Kaukauna, Wis.; Earl E. and H. B. Taylor of Milwaukee and W. S. Taylor Jr., of Iron Mountain, Mich., and a daughter, Mrs. Alwin Hanert of Appleton.

Japanese Paper Imports Show Increase

Japan's paper import trade showed substantial improvement in the first quarter of this year, according to advices to the Commerce Department from Trade Commissioner P. P. Steintorf, Tokyo.

Arrivals of foreign paper during this period amounted to 46,629,327 pounds, valued at 3,401,674 yen, an increase of 25 per cent in quantity and 30 per cent in value compared with the corresponding period of last year. (Average value of yen in first quarter of 1935, $0.30.)

By far the largest gain was registered in the case of printing paper, with fair increases also in drawing paper, writing paper, and imitation parchment. Declines occurred in packing and match paper, wall paper, pasteboard, imitation Japanese and tissue paper, the report states.

Details by countries are as yet available only for printing paper, it is pointed out. In this class Canada continued to dominate, supplying approximately 90 per cent of the total. The proportion of the United States, however, increased to 6 per cent in the 1935 period compared with less than 1 per cent recorded in the corresponding period of last year.

White & Wyckoff Reorganize

HOLYOKE, Mass., July 15, 1935—At a meeting of the stockholders of the White & Wyckoff Company, manufacturing stationers of this city, held at the offices of the company, important reorganization was effected, the stockholders voting to accept the proposal of the Board of Directors to this end.

The value of the preferred stock was voted reduced from $100 par value to $75 par value and the capital stock of the company from $1,000,000 to $750,000. Class A common stock is reduced from $5 par value to common stock of no par value and Class B common stock is all cancelled.

By the plan the preferred stockholders will get one share of the preferred stock of $75 par value and two shares of common stock for each share of preferred stock of $100 par value.

The common stock will share in the earnings after requirements of the preferred stock have been met.

Urges Development Without Subsidy

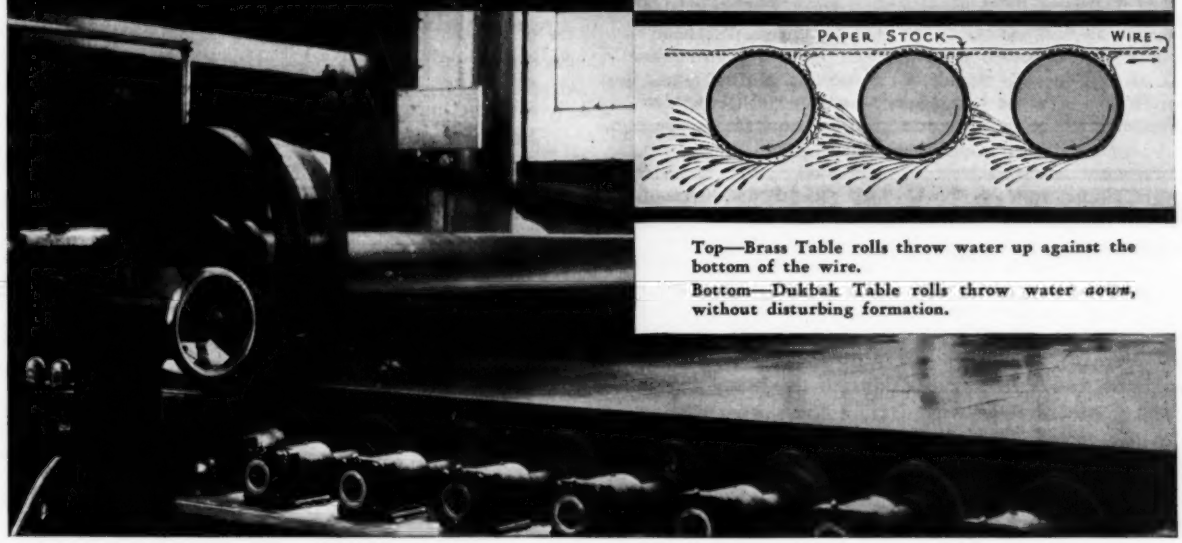
WASHINGTON, D. C., July 17, 1935—Secretary of Agriculture Wallace has sent a report to the Senate in answer to the Hale resolution urging the development of the American paper and pulp industry to the fullest extent possible without resorting to subsidy or tariff.

With proper forest conservation on the sustained yield basis, the report states, American production might be expected in a few decades to supply the home market with eventual use of as much as 500,000,000 acres of forest land.

Crown Zellerbach Establishes Development and Research Department

Crown Zellerbach Corporation announces the formation of the Development and Research Department as a new division. This department will be comprised of the Technical Departments of each operating unit. Dr. E. C. Lathrop will be the head of this department as Technical Director of the Corporation. This step is taken in order to unify and coordinate the extensive development, research and quality control activities of the various divisions. Dr. Lathrop's headquarters will be at the Camas Mill of the Crown Willamette Paper Company, of which he is also Technical Director.

DUKBAK ROLLS catch those dollars thrown on the Fourdrinier Table



Top—Brass Table rolls throw water up against the bottom of the wire.

Bottom—Dukbak Table rolls throw water *down*, without disturbing formation.

As a paper manufacturer, you throw good money on the wet end of a Fourdrinier in the form of stock. Unless the maximum amount of salable paper comes off the dry end, some of that money is wasted.

So much depends upon your table rolls during this important stage of paper-making that you cannot afford to overlook the savings Dukbak Rolls will give you.

Goodrich Dukbak Table Rolls reduce waste by assuring better formation. Their rubber cover, with its low affinity for water, casts water down, not up against the bottom of the sheet. Because they are ground straight and true, these light Dukbak Rolls move evenly with the wire, without developing high or low spots. The wire is kept absolutely level, the sheet is kept absolutely smooth and uniform.

Furthermore, corrosion cannot attack the rubber-sealed ends of Dukbak Rolls. If you should bend one of these rolls by dropping it accidentally, it can be straightened. Goodrich Dukbak Rolls can be reground easily.

If you are interested in long-lived rolls which will improve the quality of your paper and reduce maintenance costs, write today for "Modern Trends in Table Roll Construction," by E. Peterson, specialist in rubber goods for paper mill service. The B. F. Goodrich Company, Mechanical Rubber Goods Division, Akron, Ohio.

Goodrich DUKBAK *Rubber Table Rolls*

ALL *products problems* IN RUBBER

TAPPI FALL MEETING
Philadelphia and Atlantic City, September 18, 19, 20, 21, 1935.

ROLL COVERINGS • BELTING • HOSE • MISCELLANEOUS RUBBER PRODUCTS

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ESTABLISHED 1872

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TECHNICAL ASSOCIATION PAPERS—1935

Technical Association Papers, Series XVIII has been distributed to the members of the Technical Association of the Pulp and Paper Industry, the PAPER TRADE JOURNAL wishes to add its congratulations to the many that have been received by that organization for the excellent way in which it has made another great contribution to the technical literature of the pulp and paper industry.

As a publication that has worked with TAPPI for many years and has had a great interest in its growth and improvement, we have admired the progressive yet conservative manner with which it has improved its services. The association itself has had many of the characteristics of a real technically trained man—never satisfied with things as they are but requiring a solid foundation upon which to build its future.

The association, like its members, abhors complacency. Quality can always be improved, costs lowered, better operating and engineering methods found, and new products developed. Progress is being made so rapidly that it would be difficult for us to venture a guess concerning the manufacturing technique of this industry even a decade hence in the most progressive mills.

The industry is a growing one and the future can be viewed with optimism. Whether or not profits will be made is difficult to predict but even here we can not help being hopeful when we observe the increasingly large number of men with engineering and chemical education who are occupying positions in the management end of the business and we strongly urge the use of such men in the field of paper and pulp market development, and in sales management as well as in the direct manufacturing departments.

Technical Association Papers with its new attractive and durable binding befits the quality and importance of its contents. In size it has reached a new high and we know from good authority that the material is worthy of publication, serving as it does, the operative executives, the engineers, chemists, research men, educators, etc. It is, in fact, the landmark that indicates the advance in the state of the art of pulp and paper making.

It is no wonder that an association that is serving its industry as well as TAPPI has grown to its present great size. It is worthy of the support that it is receiving.

The titles of articles appearing in the Papers cover a wide field, reflecting thereby the broad interest of the association. In the field of management it presents the story of labor relations and power in a period of changing economic conditions. In operating it emphasizes the tremendous current interest in stuff preparation, in testing it advances the new standards for manufacturing and product control, and in a detailed manner it presents the results of researches that have cost thousands of dollars and is driving the industry forward and upward.

THE PAPER TRADE JOURNAL hopes that every company in the industry will obtain a copy of the current Technical Association Papers and take advantage of its many valuable recommendations. We want to see this great industry of ours advance and we appreciate that through the medium of the Technical Association's activities it will show much progress from year to year. The address of the Technical Association of the Pulp and Paper Industry is 122 East 42nd street, New York, N. Y.

MORE INCOME NOT MORE TAXES NEEDED

"The urgent need at the present time is not more taxes on income but more income to tax," it is asserted in a report of the finance committee of the Chamber of Commerce of the United States designed as a first step in its attack on President Roosevelt's tax program.

"More income means more purchasing power for consumers and more revenue for the government," the report states. "Efforts to obtain restoration of the income that our people have enjoyed in past years are directly affected by the tax policies of the government.

"In view of the shrunken income, the losses yet to be recouped, and the present methods of imposing taxes, the rates and effects of general tax policies now in force already bear too heavily upon the types of personal and corporate enterprise that must be depended upon to produce recovery."

The position of the committee was that the Roosevelt tax proposals were destructive in that they were based on the idea that "large enterprises, estates and incomes should be taxed heavily merely because of size, without sufficient attention to utility or economic value of aggregations of capital."

The estimated yields filed with the Ways and Means Committee by the Treasury Department were "evidently" designed, in the opinion of the committee, "to further other purposes, rather than to raise revenue."

Taking up the matter of balancing the budget, as relating to the tax proposals, the report declared there was "nothing in them which would tend to check expenditures, nor is there any indication that reduction in expenditures, which would so greatly assist in balancing the budget, is contemplated."

The present need, the committee declared, was not increased taxation but expenditures reduced to a more normal level.

"Prudent use of the taxing power would limit it to the production of revenues sufficient to enable the government to carry on its necessary functions," the committee went on. "To attempt wide-reaching social effects through taxation involves the danger of and perversion of the taxing power.

"If it were thought advisable to propose practical confiscation of the larger personal incomes and estates, to break up the larger corporations and to press for other distribution of wealth and income measures, then such proposals should be brought to public attention directly as social and economic reforms. They should be discussed and determined on their merits as social reforms.

"To present proposals of this character as a revenue measure is to confuse thought on the part of both Congress and the public, as emphasis is placed on the revenue aspects and the real fundamental purpose is obscured. The public is misled by this confusion of title and substance and may fail to discern the real nature of the measure which, if comprehended, might be resisted."

It was further asserted that the government, by imposing the proposed higher tax rates would be taking a step that would tend to monopolize revenues, leaving fewer possible sources of revenue to the States. This would be especially true in the matter of corporate and individual income levies, it was held.

Opposing the plan to apply a graduated scale of taxes to corporation incomes, the chamber remarked that the larger corporations employed more than 70 per cent of the wage earners in manufacturing. The report pointed out that in the depression the larger corporations had been able to continue under adverse conditions, while many of the smaller corporations, with smaller resources, had succumbed.

Code records of the NRA were cited as proof that "generally speaking," higher wages were paid by the larger corporations, whether on the hourly or piece basis.

It also pointed out that many of the larger corporations maintained pension funds, old age and sick benefits and extended other assistance to employes, inactive as well as active.

Swedish Agreement Effective Aug. 5

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—President Roosevelt has proclaimed that the new reciprocal trade agreement with Sweden is to become effective on August 5.

The chief concession granted Sweden is the pledge to maintain Swedish wood pulp on the free list. The agreement, however, reserves action on mechanical wood pulp and bleached sulphite pulp, which are furnished chiefly from Canada, and retains concessions on them as a trading lever to be utilized in the forthcoming Canadian-American trade agreement negotiations.

The United States will permit the free importation of bleached and unbleached sulphate, wood pulp, wrapping paper and paper board.

Black-Clawson Gets Order for Machine

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, July 15, 1935—What was accepted in paper mill circles in the Miami Valley as an indication of the marked improvement of the trade, was the receipt the past week of the first new paper mill contract received in machine circles for a couple of long, hard years.

The Black-Clawson Company, Hamilton, one of the largest builders of paper mill machinery in the country, obtained the order from the Downingtown Paper Company, of Downingtown, Pa.

It is said this is one of the largest orders that the Black-Clawson Company has received for several years, and that it will assure the continuance of operations by that company of its big plant, upon approximately its present schedule and basis for the next four months.

It is a well-known fact that during the years of depression there has been little, if any, development in the paper-making industry, and virtually no enlargement of facilities, or the replacement of machinery.

It is the belief here, and elsewhere, that conditions are changing and one of the first evidences of this fact was the substantial order received in this valley from the Downingtown Paper Company.

While the order will not result in increasing the number of employees at the Hamilton plant, it gives assurance of continued employment by the present force.

The Black-Clawson Company has continued to operate on a restricted basis during the depression, as have several allied concerns in the valley. Hamilton has been one of the bright spots in the country throughout the protracted period of the depression, its paper mills having been operated with a regularity that bespeaks capable management.

To Refund Marinette & Menominee Bonds

MILWAUKEE, Wis., July 15, 1935—A plan for refunding bonds of the Marinette & Menominee Paper company, held widely in Wisconsin, has been submitted by Continental Paper and Bag Corporation, parent company, to security holders.

There are outstanding $800,000 of the Marinette & Menominee Paper first mortgage 7½ per cent sinking fund bonds, due Nov. 1, 1936, assumed by Continental, which is a subsidiary of International Paper company. The proposal is to keep principal intact, but to extend maturity and reduce the interest rate.

Under the plan, $1,007,500 of new first mortgage 5 per cent bonds of Continental Paper and Bag corporation due May 1, 1960, are offered par for par in exchange for the $800,000 Marinette & Menominee Paper bonds and the $277,500 Continental Paper and Bag Mills corporation first and refunding 6½ per cent bonds now held by others than International Paper.

The new bonds will be secured by the old bonds surrendered for exchange and also by $2,589,000 Continental Paper and Bag Mills corporation bonds which International Paper now owns and has agreed to surrender in the event the plan is declared operative.

The mills on which the Marinette & Menominee bonds are secured have not been able to cover actual out-of-pocket expenses for operation and maintenance, the company stated, while net earnings of Continental Paper and Bag, even before depreciation, have not in any year since 1930 been sufficient to cover full interest on its indebtedness.

The Marshall & Ilsley bank here has been designated exchange agent for the Marinette & Menominee bonds.

Continental acquired Marinette & Menominee Paper company in 1924.

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Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

United States Patents On Paper Making

Second Quarter, 1935

Compiled by Clarence J. West, Chairman, Committee on Abstracts and Bibliography, TAPPI

Printed copies of any of the patents listed below may be obtained from the Commissioner of Patents, Washington, D. C., for ten cents each. Stamps and personal checks will not be accepted. The execution of orders will be considerably expedited if coupons are used.

Since this list is compiled from the weekly issues of the Patent Office Gazette, it is not claimed that the list is complete.

APRIL 2, 1935

1,996,082. Mineral wool product and method of making same. Edward R. Powell, assignor to Johns-Manville Corporation, New York, N. Y. Filed August 26, 1931. 4 claims. (Cl. 92-21). Water-repellent coating is applied to surfaces of individual fibers and the fibers shredded into granules.

1,996,176. Slitting machine. John Paul Smith, assignor to Du Pont Cellophane Company, Inc., New York, N. Y. Filed Dec. 1, 1931. 6 claims. (Cl. 164-39).

1,996,188. Egg carton filler machine. Leon Benoit, New York, and Edward Joseph Kanabay, Nyack, N. Y.; said Kanabay assignor to said Benoit. Filed July 21, 1933. 13 claims. (Cl. 93-37).

1,996,233. Automatic measuring apparatus. William A. Darrah, Chicago, Ill. Filed May 26, 1930. 3 claims. (Cl. 250-41.5). Use of a light sensitive cell.

1,996,314. Fibrous composition. Gordon E. Wightman, Upper Montclair, N. J. Filed March 20, 1931. 1 claim. (Cl. 154-2.6). Laminated stock suitable for electrical insulation.

1,996,343. Method of making fibrous lumber and insulating material. Walter C. Miss, Hilo, Territory of Hawaii. Filed May 9, 1932. 13 claims. (Cl. 92-41). The mat of comparatively coarse fibrous pulp is run under a dam of finely divided pulp and suction is applied to form a smooth outer surface on the mat passing under the dam.

1,996,363. Method of bleaching cellulose materials. John Campbell and Lancelot O. Rolleston, assignors to International Paper Company, New York, N. Y. Filed Sept. 27, 1930. 4 claims. (Cl. 8-2). The pulp is bleached with chlorine and the chlorine-free pulp is washed with sulphur dioxide solution to solubilize the chlorinated products of the bleaching action.

1,996,364. Protective hood for paper making machines. Henri G. Chatain, assignor to Hammermill Paper Company, Erie, Pa. Filed March 4, 1931. 7 claims. (Cl. 34-48).

1,996,591. Cutting machine for paper, cardboard and the like provided with automatic means for feeding the material to be cut. Gerhard Schmidt, assignor to Karl Biagosch, Leipzig, Germany. Filed March 23, 1931. 3 claims. (Cl. 271-54).

1,996,661. Board machine. William H. Sutherland and Charles L. Ellis; said Ellis assignor to Downingtown Manufacturing Company, Downingtown, Pa. Filed Sept. 29, 1931. 27 claims. (Cl. 92-42).

1,996,707. Manufacture of paper and the like. Alexander Nathansohn, Berlin-Wilmersdorf, Germany. Filed May 31, 1930. 5 claims. (Cl. 92-21). Process for waterproofing paper with a higher fatty acid ester and drying above 35° C.

APR'L 9, 1935

R19,521. Board machine. Charles L. Ellis, assignor to Downingtown Manufacturing Company, Downingtown, Pa. Original No. 1,879,143, dated Sept. 27, 1932. Application for reissue March 9, 1933. 40 claims. (Cl. 92-42).

R19,528. Manufacture of paper. Harold Robert Rafton, assignor to Raffold Process Corporation, Andover, Mass. Original No. 1,834,903, dated Dec. 1, 1931. Application for reissue Nov. 29, 1933. 20 claims. (Cl. 92-21).

1,996,740. Hollander. Fritz Arledter, Cologne-Kalk, Germany. Filed Dec. 21, 1932. 9 claims. (Cl. 92-25). Process of beating, disintegrating and treating fibers.

1,996,741. Method of manufacturing composite cylindrical articles. Frank H. Benge, assignor to Continental-Diamond Fibre Company, Newark, Del. Filed July 20, 1932. 8 claims. (Cl. 93-94).

1,996,797. Production of Cellulosic products. Henry Dreyfus, London, England. Filed Sept. 25, 1931. 6 claims. (Cl. 92-1). Process of producing cellulose from wood, straw, grass and the like by extracting resins, developing gaseous pressure within the materials, suddenly releasing the same and then chemically pulping the material.

1,996,832. Apparatus for producing color effect in paper. John A. Rosmait, Manistee, Mich. Filed July 30, 1932. 5 claims. (Cl. 92-40). Apparatus for discharging controlled color drops onto the pulp pool on a Fourdrinier wire.

1,996,857. Vegetable parchment. Paul Ballinger Davidson, Pittsburgh, Pa. Filed April 30, 1932. 6 claims. (Cl. 91-68).

1,996,858. Translucent paper. Paul Ballinger Davidson, Pittsburgh, Pa. Filed Nov. 2, 1933. 3 claims. (Cl. 91-68). Paper is impregnated with sucrose octaacetate with or without 5% of solid fatty acid.

1,996,859. Acidproof mortar for lining cellulose digesters and a process of lining cellulose digesters. Karl Dietz and Karl Frank, assignors to Pen-Chlor, Inc., Philadelphia, Pa. Filed Jan. 27, 1933. 9 claims. (Cl. 92-7). Use of a phenol-aldehyde resin.

1,997,136. Method of and apparatus for manufacturing fiber board. James N. Devereux, Greenville, Miss. Filed Jan. 23, 1933. 11 claims. (Cl. 92-41).

1,997,153. Manufacture of alpha cellulose. Jose Sala Pou, Barcelona, Spain. Filed Feb. 23, 1934. 3 claims. (Cl. 92-11). Alpha cellulose is prepared from bamboo.

1,997,189. Method of and apparatus for reenforcing the margins of paper. Otto Gerngross, Berlin-Grunewald, and Hellmuth Christ, Berlin-Niederschoneweide, Germany. Filed Jan. 5, 1931. 18 claims. (Cl. 93-1).

1,997,293. Structural material and method for making the same. Albert H. Brunner, assignor to Schumacher Wall Board Corporation, Los Angeles, Calif. Filed June 8, 1934. 8 claims. (Cl. 154-2). A wall board.

1,997,358. Synthetic resin product and process. John D. Cochrane, Jr., assignor to The Formica Insulation Company, Cincinnati, Ohio. Filed July 20, 1933. 10 claims. (Cl. 154-2).

1,997,359. Laminated product and process. John D. Cochrane, Jr., assignor to The Formica Insulation Company, Cincinnati, Ohio. Filed July 20, 1933. 15 claims. (Cl. 154-2).

1,997,366. Sized paper and process of manufacturing the same. Rudolf Kern, assignor to the firm Chemische Fabrik R. Baumheier Aktiengesellschaft, Zschollau, near Oschatz, Germany. Filed August 4, 1931. 4 claims. (Cl. 92-21). A homogenized rosin emulsion is used.

1,997,378. Manufacture of bags. John M. Driver, San Francisco, Calif. Filed Sept. 24, 1932. 9 claims. (Cl. 93-35.)

1,997,487. Paper manufacture. Herman Reed Harrigan and John Milton Krauss, assignors to District of Columbia Paper Manufacturing Company, Washington, D. C. Filed March 1, 1932. 2 claims. (Cl. 91-68). Application of glue and formaldehyde to an absorbent paper.

APRIL 16, 1935

1,997,569. Asphalt coating material and process of producing same. Wallace A. Craig and Fred E. Griffith, assignors to Wm. C. McDuffie, receiver for Richfield Oil Company of California, Los Angeles, Calif. Filed April 11, 1933. 9 claims. (Cl. 106-31). High melting ductile asphalt composition for manufacture of roofing felt.

1,997,583. Composition of matter and material made therefrom. Maurice Valentine Hitt, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del. Filed Sept. 28, 1933. 13 claims. (Cl. 91-68). A wrapping tissue coated with pyroxylin, a plasticizer and a wax.

1,997,594. Stencil sheet. Clarence W. Mabley, assignor to A. B. Dick Company, Chicago, Ill. Filed March 23, 1934. 9 claims. (Cl. 41-38.5).

1,997,651. Washing device comprising shower pipes. John Paramor and Harry Suckling, assignors to The Watford Engineering Works Limited, Watford, England. Filed Aug. 21, 1934. 6 claims. (Cl. 92-50).

1,997,718. Folding box and method of making the same. Clarence Lloyd Claff, Randolph, Mass. Filed Aug. 3, 1934. 9 claims. (Cl. 93-39).

1,997,773. Process for treating waste liquors from cellulose digestion to regenerate their alkali metal compound content. Gustaf Haglund, assignor to Patentaktiebolaget Grondal-Ramen, Stockholm, Sweden. Filed March 7, 1931. 6 claims. (Cl. 23-48). The liquors are concentrated and incinerated and the solid product roasted to oxidize the alkali sulphide and decompose the alkali thiosulphate, but not high enough to sinter the product.

1,997,857. Moistureproof material. William Hale Charch, assignor to Du Pont Cellophane Company, Inc., New York, N. Y. Filed May 2, 1932. 1 claim. (Cl. 91-68). A wrapping tissue of regenerated cellulose which has been waterproofed.

1,997,875. Composite matrix for printing plates. Gunnar Rosenqvist, Oakmont, Pa. Filed Jan. 2, 1932. 4 claims. (Cl. 154-46.5).

1,997,984. Paper manufacture. Joseph H. Swan, 3d, assignor to The Gardner-Richardson Company, Middletown, Ohio Filed Nov. 18, 1931. 3 claims. (Cl. 91-55). A coating machine.

1,998,046. Cylinder paper machine and suction roll for use therein. Charles L. Ellis, assignor to Downingtown Manufacturing Company, Downingtown, Pa. Filed Dec. 19, 1931. 16 claims. (Cl. 92-39).

1,998,095. Paper making apparatus. Lafayette C. Reynolds, assignor to American Writing Paper Company, Inc., Holyoke, Mass. Filed Nov. 18, 1933. 2 claims. (Cl. 92-44).

1,998,190. Manufacture of paper. Herman J. Finder and David H. Greene, Joliet, Ill. Filed Aug. 28, 1933. 12 claims. (Cl. 92-3). Paper containing as a filler finely divided cereal grain hulls.

1,998,237. Safety paper. Samuel S. Himmell, New York, N. Y. Filed April 11, 1933. 1 claim. (Cl. 91-67.95). An opaque safety paper having a coating which becomes light-permeable when it is moistened, revealing the protective marking.

1,998,344. Paper making process. Robert Thomas, Lake, Miss. Filed March 5, 1934. 4 claims. (Cl. 92-9). Use of a mixture containing caustic soda liquor, wood, borax, ammonium chloride, oxalic acid, potato starch and sodium sulphate.

1,998,381. Paper making machine. Edward John Mellentine, Kapuskasing, Ontario, Canada.

Filed Oct. 15, 1934. 1 claim. (Cl. 92-46). Metering nozzle to distribute paper stock over breast roll.

1,998,389. Process for improving cellulose. Emil Scheller, Lorsbach in Taunus, Germany. Filed Nov. 12, 1930. 4 claims. (Cl. 8-2). Process of bleaching with chloride and then with a peroxide.

April 23, 1935

1,998,758. Treatment of paper pulp. Harold S. Holt and George L. Schwartz, assignors to E. I. du Pont de Nemours and Company, Wilmington, Del. Filed April 3, 1933. 9 claims. (Cl. 92-21). Mercerized pulp is beaten in water without substantial cutting action until the freeness is 150-200 seconds and then treated with starch.

1,998,779. Floor covering and process of preparing the same. Ralph G. Jackson, Woodbury, N. J. Filed June 2, 1931. 33 claims. (Cl. 91-67.9). A non-woven felted sheet of artificially curled vegetable fibers is tinted and then waterproofed.

1,998,780. Decorative sheet material and process for preparing the same. Ralph G. Jackson, Woodbury, N. J. Filed Sept. 20, 1932. 21 claims. (Cl. 91-67.9). A felt sheet composed of chemically curled and swollen fibers of wood pulp having colored decorations.

1,998,781. Decorative sheet. Ralph G. Jackson, Woodbury, N. J. Filed Nov. 8, 1933. 28 claims. (Cl. 154-47). Laminated sheet material with decorations.

1,998,827. Composite articles and their method of manufacture. Willard P. Worrell and Francis E. Gruber, assignors to Western Electric Company, Incorporated, New York, N. Y. Filed March 10, 1932. 10 claims. (Cl. 175-21). A fibrous sheet impregnated with a phenol resin and one containing a cellulose derivative and a phenol resin are consolidated by heat and pressure.

1,998,874. Method and apparatus for packing wood chips or the like. Tetsuo Koda, assignor to Chemipulp Process, Inc., Watertown, N. Y. Filed July 5, 1934. 20 claims. (Cl. 92-7). Apparatus for packing chips in a digester.

1,998,875. Method and apparatus for packing wood chips and the like. Tetsuo Koda, assignor to Chemipulp Process, Inc., Watertown, N. Y. Filed July 5, 1934. 20 claims. (Cl. 92-7). Apparatus for packing chips in a digester.

1,998,904. Apparatus for producing boxes or bags. Vladimir Dmitrijevic Popov, Prague-Bubenec, Czechoslovakia. Filed Oct. 31, 1933. 3 claims. (Cl. 93-51).

1,999,049. Apparatus for making mottled paper. Olof H. Hedstrom, Jr., Hartford City, Ind. Filed Oct. 24, 1933. 1 claim. (Cl. 92-40)

1,999,062. Fiber gear. John C. Sherman, assignor to Brown Company, Berlin, N. H. Filed Aug. 23, 1932. 7 claims. (Cl. 74-445). Wood pulp and an artificial resinous binder.

1,999,066. Conveyor for drying plants. Frans Ivar Eugen Stenfors and Per Gunnar Artelius, assignors to Aktiebolaget Svenska Flätfabriken, Stockholm, Sweden. Filed March 24, 1932. 5 claims. (Cl. 198-84). Series of endless conveyors in paper dryer.

1,999,169. Machine for making bats of fibrous material. Patrick T. Jackson, assignor to American Reenforced Paper Company, Attleboro, Mass. Filed Dec. 31, 1932. 4 claims. (Cl. 154-1). Machine for making a composite reenforced bat of fibrous material.

April 30, 1935

1,999,260. Coated paper and process of manufacture. John E. Schopp, Oak Park, Ill. Filed June 27, 1932. 8 claims. (Cl. 91-68). Method of making varnished paper by coating with a mixture of pigment and casein.

1,999,282. Wrapper pad. Ludwig Clemens, Berlin, Germany. Filed March 23, 1932. 1 claim. (Cl. 154-54). Laminated pad of alternate layers of plane and indented paper.

1,999,282. Process of manufacturing wrapper pads. Ludwig Clemens, Berlin, Germany. Filed July 11, 1933. 1 claim. (Cl. 154-33). Apparatus.

1,999,402. Machine for slushing sheets of pulp. William T. Doyle, Thomas J. Sturtevant and Laurence H. Sturtevant, assignors to Sturtevant Mill Company, Boston, Mass. Filed June 26, 1934. 11 claims. (Cl. 92-20). Combination of a rotary hammer mill and conveyors.

1,999,480. Mechanism for applying adhesive to container sealing flaps. Forestus Reid, assignor to The Procter and Gamble Company, Cincinnati, Ohio. Filed July 10, 1930. 9 claims. (Cl. 91-12).

1,999,483. Cellophane covered cord and method of manufacture. Wade E. Sackner, assignor to Grand Rapids Fibre Cord Company, Grand Rapids, Mich. Filed Feb. 23, 1933. 7 claims. (Cl. 117-53). A flexible hard-twisted smooth-surfaced paper cord covered with cellophane.

1,999,607. Defiberizer. William G. Hagmaier and Ernest C. Shaw, assignors to Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Filed Feb. 21, 1930. 5 claims. (Cl. 83-75). Apparatus for reducing masses of wood or like fibrous material to separated fiber particles useful for paper pulp.

May 7, 1935

2,000,006. Paper making machine. Samuel Amantea, Niagara Falls, N. Y. Filed Nov. 12, 1934. 15 claims. (Cl. 92-44). Head box arrangement.

2,000,065. Fiber tube rolling machine. Homer J. Davis, Wilmington, Del. Filed Sept. 2, 1930. 59 claims. (Cl. 93-83).

2,000,085. Pulp molding machine. Alonzo H. Maginnis, Rochelle, Ill. Filed Jan. 5, 1934. 11 claims. (Cl. 92-56).

2,000,268. Hydration of pulp. George S. Witham, Jr., Lincoln, N. H. Filed Oct. 5, 1932. 10 claims. (Cl. 92-44). A beating engine of the hollander type.

2,000,269. Apparatus for feeding plaster board into a drying kiln. Carl Absmeier, assignor to United States Gypsum Company, Chicago, Ill. Filed Sept. 29, 1928. 5 claims. (Cl. 198-21). A conveyor.

2,000,347. Coating of paper. John D. Murray, assignor to The Murray Liquafilm Corporation, Chicago, Ill. Filed July 24, 1933. 16 claims. (Cl. 91-67.9). A transparent protective coating for a sheet of ink printed paper or the like.

2,000,416. Felted asbestos product. William D. Pardoe, assignor to Thermoid Rubber Company, Trenton, N. J. Filed Jan. 11, 1933. 8 claims. (Cl. 154-49).

2,000,528. Laminated composite paper. Garrett B. Linderman, Jr., assignor to Pittsburgh Equitable Meter Company, Pittsburgh, Pa. Filed Dec. 27, 1932. 2 claims. (Cl. 154-46). A layer of metallic foil is secured to external sheets of paper of writing paper quality.

2,000,532. Waterproof abrasive paper. Carl Munch, assignor to Atlas-Ago, Chemische Fabrik, Aktiengesellschaft, Molkau-bei-Leipzig, Germany. Filed Oct. 19, 1933. 4 claims. (Cl. 51-280). Unsized paper having abrasive material on one face bound with a collodium solution is treated with alcoholic resin solution containing ethyl acetate or acetone.

2,000,546. Paper drying process and apparatus. John O. Woodsome, Detroit, Mich. Filed April 18, 1931. 4 claims. (Cl. 34-48). Method of passing relatively cool, conditioned air through an enclosed space for drying the paper sheet.

2,000,562. Process of removing resin from sulphite cellulose. Gustaf Haglund, assignor to Patentaktiebolaget Gröndal-Ramen, Stockholm, Sweden. Filed Nov. 28, 1933. 19 claims. (Cl. 92-13). Resin is removed from pulp by a squeezing operation and the pulp is then treated with a de-resinizing agent.

2,000,663. Process of drying materials. William A. Darrah, assignor to United States Gypsum Company, Chicago, Ill. Filed Oct. 15, 1930. 14 claims. (Cl. 34-24). The product is subjected to the action of a moving stream of hot products of combustion to which free ammonia has been added to neutralize the acids in the gases.

2,000,712. Box machine. Charles H. Nitsch, assignor to Stokes and Smith Company, Philadelphia, Pa. Filed Jan. 23, 1935. 5 claims. (Cl. 93-4).

May 14, 1935

2,000,989. Manufacture of bags. Thomas M. Royal, Philadelphia, Pa. Filed July 30, 1932. 9 claims. (Cl. 93-35).

2,001,022. Indirect heating and circulating system for sulphite digesters. Harlan W. How, Aspinwall, Pa. Filed Sept. 8, 1933. 27 claims. (Cl. 92-7). Method for withdrawing, heating and returning liquor to the digester.

2,001,023. Creped paper. Charles M. Howell and James d'A. Clarke, assignors to Scott Paper Company, Chester, Pa. Filed Oct. 23, 1934. 6 claims. (Cl. 154-55). A soft creped multiply towel or toilet tissue paper.

2,001,031. Cylindrical articles and method and apparatus for manufacturing the same. Gustav E. Landt, assignor to Continental-Diamond Fibre Company, Newark, Del. Filed Feb. 4, 1932. 3 claims. (Cl. 154-2). Method of making a cylindrical article from fibrous sheet material and a resinous binder.

2,001,049. Gummed paper and method of preparing. Gardner R. Alden, assignor to Dennison Manufacturing Company, Framingham, Mass. Filed April 29, 1931. 15 claims. (Cl. 91-68).

2,001,177. Winding mechanism for paper bottles. Andrew Bodor, assignor to Reinforced Paper Bottle Corporation, New York, N. Y. Filed March 9, 1933. 6 claims. (Cl. 93-79).

2,001,208. Cylinder paper machine. Samuel V. Minskey, Leroy T. Foley and Henry Leopold, Knox County, Tenn. Filed Dec. 15, 1933. 18 claims. (Cl. 92-43). A vat for a pond of fibrous stock and stock feed boxes on both sides of said vat.

2,001,246. Manufacture of paper. Orvon P. Gephart, assignor to Howard D. Meincke, Miamisburg, Ohio. Filed July 13, 1932. 5 claims. (Cl. 92-21). Method of incorporating calcium sulphate in paper.

2,001,268. Pulp treating process. John D. Rue, assignor to Hooker Electrochemical Company, New York, N. Y. Filed Oct. 18, 1933. 10 claims. (Cl. 8-2). Method of bleaching chlorine, the pulp being finally treated with alkali.

2,001,276. Laminated cellulose unit and process of making same. Irving Fink Laucks, assignor to I. F. Laucks, Inc., Seattle, Wash. Filed Nov. 21, 1932. 8 claims. (Cl. 20-91). Laminations of cellulosic material are united by an adhesive oxycellulose viscose.

2,001,339. Coating paper. Joseph H. Wood, Chicago, Ill. Filed Feb. 9, 1931. 2 claims. (Cl. 91-68).

2,001,399. Machine for making shingles. John Andrew Scharwath, Jersey City, N. J. Filed Dec. 10, 1932. 19 claims. (Cl. 91-15).

2,001,442. Machine for and method of manufacturing bag tubes. Frank G. Wikstrom, assignor to Arkell and Smiths, Canajoharie, N. Y. Filed July 18, 1928. 34 claims. (Cl. 93-81).

May 21, 1935

2,001,934. Bag and method of making same. John Mitchell Munson, assignor to The Munson Bag Company, Cleveland, Ohio. Filed Sept. 6, 1932. 7 claims. (Cl. 93-35).

2,002,106. Process of treating vegetable fibers. Albert Bodner and Ernst Weiss, assignors to Heberlein Patent Corporation, New York, N. Y. Filed Aug. 10, 1932. 8 claims. (Cl. 8-20). Vegetable cellulose material is treated with cuprammonium and a free alkali metal hydroxide.

2,002,404. Pulp strainer. Marcel Lamort, assignor to Etablissements E & M Lamort Fils, Vitry-le-Francois, France. Filed Aug. 12, 1933. 6 claims. (Cl. 92-33).

May 28, 1935

2,002,554. Apparatus for splicing strips of paper. William Townley, assignor to United States Gypsum Company, Chicago, Ill. Filed June 25, 1931. 18 claims. (Cl. 164-99).

2,003,065. Composition for coating sheets, fibrous stocks and the like. Charles M. Boyce, assignor to John R. Ditmars, New York, N. Y. Filed June 20, 1931. 8 claims. (Cl. 91-67.9). Casein and gelatin in aqueous solution.

2,003,103. Means and method of stringing a fourdrinier wire. Earl E. Berry, assignor to Beloit Iron Works, Beloit, Wis. Filed Aug. 20, 1932. 45 claims. (Cl. 92-44).

2,003,123. Woven wire belt for paper making machines. Harry G. Specht, assignor to Eastwood-Nealley Corporation, Belleville, N. J. Filed June 22, 1934. 9 claims. (Cl. 245-8).

2,003,124. Woven wire belt for paper making machines. Harry G. Specht, assignor to Eastwood-Nealley Corporation, Belleville, N. J. Filed June 22, 1934. 9 claims. (Cl. 245-8).

2,003,150. Pulp screening machine. Nelson Moore Knight, Weymouth Heights, Mass. Filed Oct. 29, 1934. 10 claims. (Cl. 92-34).

2,003,192. Method of producing moisture-proof and air tight coatings. Wilhelm J. H. Hinrichs, Hamburg, and Hermann Wittkowski, Lockstedt-Niendorf, near Hamburg, Germany. Filed July 21, 1933. 7 claims. (Cl. 91-68). Wall paper and the like are treated with rubber latex.

June 4, 1935

2,003,347. Manufacture of cellulose or cellulosic materials. Henry Dreyfus, London, England. Filed Jan. 25, 1933. 2 claims. (Cl. 92-9). Material is digested with an aqueous solution of a diolefin glycol at a temperature between 120 and 180° C.

2,003,404. Slitting mechanism for paper making machines. Charles W. Valentine, assignor to The Bagley and Sewall Company, Watertown, N. Y. Filed Sept. 16, 1931. 13 claims. (Cl. 164-65).

2,003,695. Woven wire fabric. Joseph O'Neill, Port Chester, N. Y. Filed Aug. 6, 1932. 7 claims. (Cl. 139-425). Warp wires of an alloy including copper, manganese and silicon.

2,003,699. Roofing product. Thomas Robinson, assignor to Lancaster Asphalt, Inc., New York, N. Y. Filed Sept. 12, 1930. 2 claims. (Cl. 108-8).

2,003,752. Bendable laminated product. Gustave E. Landt, assignor to Continental-Diamond Fibre Company, Newark, Del. Filed Oct. 15, 1932. 16 claims. (Cl. 154-43). Fibrous sheet material impregnated with a thermo-plastic resin securely united to a metal sheet.

2,003,753. Vertically adjustable tables for fourdrinier machines. Lawrence L. Lapeyrouse, Mobile, Ala. Filed June 10, 1932. 2 claims. (Cl. 92-44).

2,003,923. Screen plate support. George Clausen, Longview, Wash. Filed Nov. 1, 1934. 6 claims. (Cl. 92-30).

June 11, 1935

2,004,129. Apparatus for handling strip material. Adolph Potdevin, assignor to Potdevin Machine Company, Brooklyn, N. Y. Filed Jan. 8, 1932. 8 claims. (Cl. 271-2.2). Method of forming slack in the material and applying an air blast to the material.

2,004,143. Absorbent paper dispensing. Vanderveer Voorhees, Hammond, Ind. Filed July 30, 1932. 7 claims. (Cl. 92-68). An absorbent paper towel treated in a restricted area with a water-resistant size.

2,004,204. Reenforcement for mats. Oscar W. Jackson, Rockville Centre, N. Y. Filed April 24, 1934. 3 claims. (Cl. 154-49).

2,004,205. Smelting furnace for black liquor. Alfred G. Kernin, assignor to Mosinee Paper Mills Company, Mosinee, Wis. Filed Jan. 9, 1932. 2 claims. (Cl. 23-277).

2,004,367. Rotary wood chipping machine. Walter I. Brown, Oakland, Calif. Filed Nov. 21, 1932. 6 claims. (Cl. 83-75).

2,004,484. Stencil sheet and method of making the same. Louis G. Brandt, assignor to The Multistamp Company, Inc., Norfolk, Va. Filed May 3, 1932. 9 claims. (Cl. 41-38.6). Yoshino paper is coated with gelatin, soap and an oil (13:42:56 by weight).

2,004,507. Flat screen frame. Joseph J. Moravec, Washougal, Wash. Filed June 27, 1934. 23 claims. (Cl. 92-30).

2,004,604. Box making machine. George F. Ford and Walter F. Pittman, assignors to Fibreboard Products, Inc., San Francisco, Calif. Filed Feb. 14, 1933. 14 claims. (Cl. 93-47).

2,004,657. Method and apparatus for making sealed pads. George A. Gerard, assignor to Cotton-Wood Products, Inc., Reading, Mass. Filed Nov. 10, 1931. 39 claims. (Cl. 154-33).

2,004,658. Method and machine for making cushion pads. George A. Gerard, assignor to Cotton-Wood Products, Inc., Reading, Mass. Filed Nov. 10, 1931. 22 claims. (Cl. 154-33).

2,004,706. Process for the production of fertilizer from cellulose materials by bacterial action. Ferdinand Adolphus Nuske, East Malvern, Victoria, Australia. Filed March 3, 1931. 2 claims. (Cl. 71-6).

2,004,723. Composite flooring material. Harold C. Harvey, Trenton, N. J. Filed Aug. 4, 1934. 4 claims. (Cl. 154-49).

2,004,799. Process for preparing ammonium sulphite or bisulphite solutions. Roger W. Richardson, assignor to E. I. du Pont de Nemours and Company, Wilmington, Del. Filed April 23, 1931. 2 claims. (Cl. 23-129).

JUNE 18, 1935

2,004,935. Cementitious sheet. René Dorn and Martin Willis, New Orleans, La. Filed April 28, 1932. 17 claims. (Cl. 154-55). Corrugated structural sheet from pulp containing cementitious material.

2,004,936. Apparatus for the manufacture of cementitious sheet. René Dorn and Martin Willis, New Orleans, La. Filed Jan. 16, 1934. 17 claims. (Cl. 25-42). A hopper.

2,005,105. Safety paper. John Wallace Neff, assignor to Milton C. Johnson Company, New York, N. Y. Filed June 23, 1930. 6 claims. (Cl. 91-67.95). A safety paper carrying cobalt ferro-cyanide.

2,005,190. Process for the digestion of vegetable growths to produce cellulose. Herman B. Kipper, Accord, Mass. Filed April 13, 1933. 9 claims. (Cl. 92-9). Nitric acid mixed with organic liquids is used.

2,005,356. Heat insulating material and method of waterproofing same. Edward A. Toohey and Archibald Hughes, assignors to Johns-Manville Corporation, New York, N. Y. Filed Aug. 4, 1927. 7 claims. (Cl. 106-18).

2,005,378. Manufacture of cellulose material. Franz Kiel, assignor to one-half to Zellstofffabrik Waldhof, Mannheim-Waldhof, Germany. Filed Nov. 9, 1932. 2 claims. (Cl. 92-21). The pulp is impregnated with a solution of stannous chloride to prevent discoloration, particularly reddening.

2,005,397. Manufacture of strengthened absorptive paper. Milton O. Schur, assignor to Brown Company, Berlin, N. H. Filed Jan. 21, 1933. 4 claims. (Cl. 91-68). A paper for towelling, containing 0.75% of regenerated cellulose and a wetting-out agent.

2,005,422. Method of concentrating waste liquors. Clarence C. Unicke, Palisade, and Charles L. Wagner, Boonton, N. J. Filed Oct. 31, 1933. 2 claims. (Cl. 252-7). Method of evaporating waste sulphite liquors.

JUNE 25, 1935

R19,627. Process of making felted mineral fiber. Edward R. Powell, assignor to Johns-Manville Products Corporation, New York, N. Y. Original No. 1,899,056, dated Feb. 28, 1933. Application for reissue Feb. 27, 1935. 23 claims. (Cl. 154-28).

2,005,742. Process for deinking imprinted paper. Pierre R. Hines, Portland, Ore. Filed May 25, 1934. 11 claims. (Cl. 92-9).

2,005,799. Apparatus for removing bark from logs. Frederick A. Nicholson and Wilmot T. Pritchard, assignors to Stetson-Ross Machine Company, Seattle, Wash. Filed Aug. 7, 1933. 9 claims. (Cl. 144-208).

2,005,839. Cylinder machine. Jacob Edge, assignor to Downingtown Manufacturing Company, Downingtown, Pa. Filed Jan. 26, 1933. 8 claims. (Cl. 92-43).

2,005,846. Roll labeling machine. Philip D. Parsons, assignor to Scott Paper Company, Chester, Pa. Filed Feb. 17, 1934. 13 claims. (Cl. 216-25). Machine for wrapping paper rolls.

2,005,885. Roll. William E. Brindley, assignor to Westinghouse Electric and Manufacturing Company, Pittsburgh, Pa. Filed Jan. 23, 1932. 7 claims. (Cl. 92-77). Method of making a composite roll.

2,005,929. Paper making apparatus and process. Earl E. Berry, assignor to Beloit Iron Works, Beloit, Wis. Filed Aug. 18, 1932. 4 claims. (Cl. 92-38). A suction roll.

2,005,979. Drier felt for paper making machines. Tom Milnes, assignor of one-half to Ayers Limited, Lachute Mills, Quebec, Canada. Filed July 14, 1934. 4 claims. (Cl. 24-33).

2,006,016. Method of making pigmented paper. Alwin C. Eide and John Henry Calbeck, assignors to American Zinc, Lead and Smelting Company, St. Louis, Mo. Filed July 31, 1934. 25 claims. (Cl. 92-21). Undried zinc sulphide is incorporated into the pulp.

2,006,036. Method of making containers. Herbert Maclean Ware, Northwood, England. Filed Jan. 4, 1933. 2 claims. (Cl. 93-36).

2,006,138. Apparatus for separating sulphurous acid from sulphite waste liquor. Karl Heinemann, assignor to American Lurgi Corporation, New York, N. Y. Filed April 26, 1934. 3 claims. (Cl. 183-2.5). A degasifier for separating sulphur dioxide from waste sulphite liquor.

2,006,208. Dull finish coated paper. Donald B. Bradner, assignor to The Champion Coated Paper Company, Hamilton, Ohio. Filed Feb. 1, 1932. 10 claims. (Cl. 91-68). Uncooked starch is applied to the paper, which is dried, calendered and the starch then swelled.

2,006,209. Dull finished coated paper. Donald B. Bradner, assignor to The Champion Coated Paper Company, Hamilton, Ohio. Filed May 25, 1933. 3 claims. (Cl. 91-68). Paper is coated with an aqueous coating composition comprising pulverized cellulose, dried, calendered and the coating moistened.

2,006,215. Mechanism for making and applying transparent window patches to envelopes. Henry Kassekert and Frank J. Kaeser, assignors to E. J. Spangler Company, Philadelphia, Pa. Filed Jan. 14, 1933. 5 claims. (Cl. 93-61).

2,006,229. Charles N. Cone and Earl D. Brown, assignors to The Glidden Company, Cleveland, Ohio. Filed March 5, 1930. 3 claims. (Cl. 91-68). Method of coating paper with a vegetable protein from seed materials and a lime-containing material.

The Use of Adhesives for Laminating Operations*

By Russell Morehouse[1]

Abstract

The paper deals with some factors governing the use of adhesives for laminating board together with the results obtained under various manufacturing conditions.

The art of laminating, or binding together, a multiplicity of plies of paper to produce a composite whole has been practiced for many years. The art is not old enough, however, to prevent men now engaged in the production of laminated paper products from regarding, in retrospect, their early endeavors to fabricate containers and other articles made of paper.

It shall be the purpose of this discussion to consider the fabrication of the more common forms of laminated products such as corrugated paper board, solid fiber boxboard and wallboard. Special attention will be given to the function of the adhesive used in the laminating operation and the effect of other factors upon the proper functioning of the adhesive.

Data gathered and observations made by the writer during the past 15 years have indicated the impossibility of making definite statements without qualification by a recitation of all the facts. A discussion such as this must therefore be general in nature and the experience of others may show some variation in specific cases.

Vegetable adhesives, such as potato starch, were used during the infancy of the industry. A desire to operate more economically, and at higher machine speeds, led to improvements in fabricating equipment and the subsequent use of adhesive silicate of soda, which was better adapted to the rapidly changing conditions. Improved starch adhesives made from corn have more recently entered the laminating field for solid fibre.

Fabricating Materials

Any laminating adhesive, which is used with success at this advanced date, must be endowed with versatility.

The so-called jute liner stock, chip and ground-wood papers, and paper made from grain straws, were the only fabricating stocks used from the beginning of the industry until a comparatively recent date. The fabricator now has available for his use a large variety of fabricating materials, included among which are the original jute, chip and straw, and in addition, solid kraft liners made by both cylinder and Fourdrinier processes, filled krafts, corrugating papers made of kraft, pine-wood and chestnut-wood pulps, and other materials. These various materials possess characteristics which differ greatly one from the other, but any satisfactory adhesive must meet the requirements of any and all conditions.

Let us study these conditions more closely. The modern transition has been toward greater fabricating economies and it has been found possible to reduce the amount

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[1] Member TAPPI, Engineering Department, The Philadelphia Quartz Company, Philadelphia, Pa.

of stock used in the production of certain liner and filler boards without seriously affecting the strength of the product. This reduction in furnish has resulted in the production of a sheet having less intimate fibre formation, and, consequently, less resistance to adhesive penetration.

The kraft liners generally used are likewise made with a relatively open formation of the fibers and they likewise offer reduced resistance to penetration of the adhesive

Finish and Moisture Content

Reference should here be made to other pertinent factors such as finish and moisture content of the papers. Liner and filler boards may be dry-finished or they may have any one of a number of water finishes. A dry-finished sheet will exhibit less resistance to adhesive penetration than a sheet having a water-finish.

Moisture content of the paper also has important bearing upon adhesive penetration. Absorption of adhesive is excessive when the paper is dry, and conversely, adhesive penetration is retarded and the adhesive requires a relatively longer period to form a bond when the paper contains an abnormal percentage of moisture.

It is thus evident that the proper functioning of the adhesive is affected by a number of factors.

Adhesives

Earlier in the discussion, it was said that silicate of soda and for solid fiber, laminating adhesives made from corn starches, are the most widely used laminating adhesives at this writing, although a number of other adhesives are used for specific operations not covered by this article.

The physical characteristics of the adhesive silicates of soda and the starch adhesives are widely different.

A wide variety of silicates of soda is commercially available but the requirements of laminating operations rather definitely fix the specifications of adhesive silicates suited to this type of work. Such silicates can be described as water solutions having an $Na_2O : SiO_2$ ratio approximating 1:3.25. The Specific Gravity of such solutions will be found to extend from a minimum of 1.37 to a maximum of 1.42. The corresponding viscosities will have 115 centipoises Absolute as a minimum and will extend to a maximum of 785 centipoises Absolute. These silicate solutions are of a light or medium syrup-like consistency. They have but little tack, flow readily and set, or form a bond, quickly by the loss of small quantities of water.

The starch adhesives are also water solutions which may be neutral or very slightly alkaline. These adhesives have specific gravities which may approximate 1.135 to 1.14 with corresponding viscosities which are too great to measure with ease at ordinary temperatures. These adhesives also set, or form a bond, by the loss of water, but unlike the silicate adhesives, they are very tacky, and remain tacky in the adhesive film for a relatively long time, forming their bond more slowly than the silicate adhesives.

It is well here to point to the fact that the basic differences between the silicate and the starch adhesives emphasize the importance of securing rapid contact of the various plies when the adhesive is silicate of soda whereas the necessity of immediate contact does not seem so important when a starch adhesive is used.

Formation of Bond

The adhesives under discussion set and form their bond by the loss of water which is absorbed into the various paper plies, and some of which ultimately evaporates into the atmosphere. Penetration of the adhesive is thus a function of the bond and satisfactory adhesion cannot be secured unless the adhesive penetrates below the actual surface of the paper and interlocks with the paper fibers. Thus it will be obvious that an insufficient quantity of adhesive may succeed in forming a temporary bond, but because of lack of or insufficient penetration, subsequent handling or treatment of the laminated sheet will cause the plies to separate at the adhesive line without tearing or lifting the fibers of the paper stock.

The importance of adhesive penetration as related to condition and quality of the paper stock can hardly be over-emphasized. Two adjacent plies which are widely dissimilar with regard to density or surface texture will frequently lead to wasteful consumption of adhesive, and that which is of greater importance, production of fabricated waste, attended by reduced machine speeds. Such difficulties are sometimes difficult to remedy but use of the adhesive at a slightly higher concentration has proved effective in some cases.

Cold Stock

Roll stock is sometimes brought direct from a cold, unheated storage warehouse and placed upon the roll stands for fabrication into corrugated or solid fiber board. Adequate pre-heating of such cold paper stock is often sufficient to prepare the paper for the laminating operation. If the cold stock is not sufficiently pre-heated, the viscosity of the adhesive is greatly increased by the chilling action of the cold paper and penetration is retarded or prevented. Storage of roll stock in a heated atmosphere prior to use is at all times recommended, but, if impossible, ample pre-heating on the laminating machine is often a satisfactory substitution.

Moisture in Paper

Paper stocks containing excess or insufficient moisture are yet to be considered. Of the two types, a paper having a low moisture content is probably the worst offender, since it causes the adhesive rapidly to be absorbed into the paper leaving little or no adhesive for the bond formation. The expedient of spraying wet steam upon the paper stock prior to application of the adhesive has at times proved effective. Stock containing excessive moisture can usually be laminated but at reduced machine speeds.

Adhesive Temperature

Silicate of soda and the starch adhesives readily respond to temperature changes. When these adhesives are heated their viscosities are reduced, that is, they flow more readily. Conversely, when these adhesives are cooled, they become more viscous. The starch adhesives usually must be used hot in order to assure easy manipulation and economical use.

Adhesive silicates of soda are generally used at factory room temperatures, which may be of the order of 60 deg. to 70 deg. F., although it is conceded that summer weather conditions sometimes cause use of the silicate at higher temperatures. Accurate control of silicate temperature is sometimes warranted, in which case 100 deg. F. should probably be considered as the maximum advisable degree of elevation. The correct temperature at which to operate can best be determined by adjustment to plant conditions.

This discussion has been concerned chiefly with some of the difficult conditions which are encountered and which must be satisfied by the adhesive. Much can be accomplished, however, by using care in selecting the proper adhesive grade for the work to be done and by giving close attention to the technique of adhesive application and machine operation.

Resumé of Recent Literature on Hydration Theories and Associated Phenomena*

By F. A. Simmonds[1]

Abstract

Recent literature dealing with "hydration," as the term is used in papermaking, and such associated phenomena as sheet and fiber properties, is presented. The physical conception of "hydration" is generally accepted, although varying viewpoints of the mechanism are evident.

The central theme of the extensive literature on the pulp-water relation in papermaking is concerned mainly with the phenomenon termed "hydration." This phenomenon has been considered generally from the standpoint of pulp or stuff properties, and in terms of the sheet properties of finished paper. Only recently have investigators begun to emphasize the importance of the individual pulp fibers and to develop methods for the measurement of individual fiber properties to make such studies possible.

Publications on the pulp-water relation range from the base exchange property of permutities and colloidal clays through the molecular structure of cellulose to aerogels. During the last few years this extensive literature has been ably reviewed in several papers with the purpose of correlation and interpretation and, in most cases, in the light of the experimental data presented by the respective authors. In these reviews the emphasis varies and different viewpoints are presented, all of which can be read with benefit. These papers are referred to at the end of this abstract by means of complete title.

It is only necessary in this review to call attention to these surveys already familiar to those engaged in this field. Others contemplating similar activity will, of course, desire to peruse them in their entirety. The purpose here, then, is to abstract the papers that have appeared since James d'A Clark (*11*) discussed, at the close of 1933, the prominent theories of beating and of sheet properties; to cite certain reports that present data relevant to the general problem although their several objectives do not deal specifically with a theory of beating or strength properties of paper.

History of the Physical Conception of Beating

In reviewing the comparatively recent literature there was a period when the inference might be gained that it was generally accepted that hydration was a result of chemical changes in the nature of the pulp—that degradation products were formed through hydrolysis of the cellulose induced by the mechanically applied energy. This inference, however, scarcely appears justifiable for the record shows clearly that the purely physical conception of beating and the resultant sheet properties has never lacked able proponents. Actually, it seems that there was but an interlude when the issue was confused by the chemist's introduction of the term "hydration" to describe the beating phenomena which had been more aptly described by the papermaker's term "wetness."

In a chronological review of the position the following statement by Moe (*22*) appeared in 1915: "The ordinary view now taken seems to be that the difference between imitation vegetable parchment paper and the Mitscherlich pulp from which it is produced is only a physical one, namely, the splitting of the fibers into filaments or fibrils, which by interlacing give the closed sheet characteristic of that paper." Gesell and Minor (*17*) after a study of drainage properties concluded: "The most tenable theory of hydration seems to be that it is the process of bringing into action the electrostatic affinities of the colloidal cellulose molecule, by means of which the hydroxyl- and hydrogen-ions of the water are absorbed (by the OH groups of the cellulose) causing the fiber to swell into a loose gel, thus giving to the stock its characteristic slowness." They discount the theory that a "glutinous" (gelatinous) material is formed from the cellulose during beating which acts as a cementing material in the sheet to produce strength, on the ground that no such cementing matrial has ever been isolated. In 1922 Allison (*1*) supported the physical change theory as a result of experiments (not described) made several years before. Nakano (*23*), in 1924, concluded that no chemical combination resulted between cellulose and water during beating but that the resultant change in drainage properties was due to an increased imbibition of water in conjunction with other strictly physical changes. In 1926 James Strachan (*32*) advanced a physical theory which he believed accounted for not only the effects of beating in terms of stuff properties but also the strength properties of paper. Although such was not published until 1926, as early as 1900 he concluded, as a basis for future experimentation, that the problem dealt with a two-phase system; solid and liquid in the wet stock, and solid and gas in the drying of paper. Three years later Campbell and Pidgeon (*9*) reported determinations of the water vapor pressure of unbeaten and beaten pulp at various degrees of dryness. These and subsequent data showed the sorption isotherms to be continuous and that beating caused but a small increase (possibly within the limits of experimental error) in the amount of water sorbed by the pulps under equilibrium conditions. It was concluded that neither a chemical hydrate nor an increase in hydration, in the colloidal sense, resulted from beating. It was here that Campbell advanced purely physical theories of beating and paper strength which he has developed to its present completeness. The results of the above sorption studies were later confirmed by Seborg and Stamm (*29*).

Porrvik (*24*) contended the slowness of pulp to be due to bound water present and the binding of fibers together in paper to be due to a colloidal chemical cohesion rather than purely a mechanical felting process. He divided the beating process into three stages with essentially different effects on the fibers during these stages. In 1930 Schafer and Carpenter (*10*) described a rate of flow test as means of evaluating the physical properties of mechanical pulps, hydration being included by them among these properties. Shortly after, Curran, Simmonds and Chang (*13*) presented evidence relative to the chemical and physical effects of beating from which they concluded that normal

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[1] Member TAPPI, Assistant Chemist, Forest Products Laboratory, Forest Service U. S. Department of Agriculture, maintained at Madison, Wis., in cooperation with the University of Wisconsin.

beating results in no change in the chemical characteristics of chemical wood pulps, and, in accord with other investigators, that the strength of paper is not due solely to mere physical entanglement of the fibers. These conclusions were confirmed by Kress and Bialkowsky (*19*) who reported, in addition, extensive data concerning the swelling of pulps in various liquids in correlation with the behavior of pulps when beaten in such liquids. In this same year McGregor (*20*) reported additional experiments to show that cellulose and water do not unite in definite proportions as a result of beating. Doughty (*14*) established the relation between pressure applied to wet paper sheet, and the resultant solid fraction and tensile strength of the dry sheets, proving that by the application of sufficient pressure to wet sheets of unbeaten pulp, tensile strength properties of the same order of magnitude result as when such pulps are beaten to develop sheet strength and normal pressures applied. However, he also found that when these high pressures were applied to slightly beaten pulps still higher tensile strength resulted which was not appreciably increased in the case of pulps beaten for longer periods. This indicated a progression of beating in at least two stages. From thence up to the publication of Clark's (*11*) interpretive review we find additional papers by Campbell and one or two others that are abstracted herein.

Related Articles

It is well known that the beating characteristics and strength properties of pulps vary, aside from other causes, in accordance with the severity of digestion—as more and more of the "impurities" of the wood are removed with an attendant decrease in pulp yield. However, only a comparatively small amount of experimental data has been reported that deals directly with the reactions of pulps of variable extraneous content, such as hemicelluloses and extractives, under mechanical processing and the relation of such reactions to theoretical considerations of beating and paper properties.

Recently a considerable fund of information bordering on this field has been presented by Richter (*25*). In this paper the usual chemical characteristics of 53 pulps varying as to type and kind are recorded. These properties are interpreted in terms of the uses for which such pulps are suitable. The significance of the common strength tests are discussed and the papermaking characteristics of high alpha-cellulose pulps described. The low pentosan content of many of the purified wood pulps prove that it is possible to simulate cotton in this respect and that some of these pulps have papermaking properties of unusual quality. The strength of paper is ascribed to the interfelting of fibers plus the bonding effect of cellulose mucilage, the properties of which are largely determined by the chemical composition of the fibers. Wood pulp of high alpha-cellulose content "hydrates" more slowly than ordinary sulphite pulp and the resultant paper is characterized by increased tearing and folding strengths.

Young and Rowland (*35*) found the relation between the swelling tendency and pentosan content of a number of softwood pulps to be approximately linear. These results tend to substantiate the theory that adsorption is a function of secondary valence forces in the micelle (crystallite).

In a previous instance Ritter, Simmonds, and Seborg (*28*) had made a comparison of the strength properties of cellulose isolated directly from wood by chlorination with those of sulphite pulps to obtain an indication of the combined effect of an unusually high content of ray cells and the easily hydrolyzed carbohydrates. The cellulose, of a high white, obtained in a yield of 58 per cent developed a burst ratio of 0.90 as compared with 1.33 of an unusually strong, unbleachable sulphite pulp of 54 per cent yield. The opacity of test sheets prepared from the "chlorination" pulp decreased about 30 per cent more rapidly during milling than did the sulphite. A comparison of various pulps can be made in terms of the strength of sheets and individual fibers as is illustrated in Table I.

Another wood fraction that will be of interest in future processing studies is the total carbohydrate fraction of wood isolated by Ritter and Kurth (*27*) for which they have proposed the name "holocellulose." The yield of this material was about 76 per cent and in color resembled well-bleached Cross and Bevan cellulose. It was very similar in physical structure to the wood sawdust from which it was isolated. This fraction contained a part of the methoxyl groups of the wood, the total acetyl groups, and the total carbon dioxide-forming material but no lignin.

TABLE I
COMPARISONS OF FIBER AND SHEET STRENGTH

Material	Time processed Minutes	Bursting strength Pts./lb. /ream [1]	Tensile strength at rupture Lbs./ sq. in.	Solid fraction	Reference
White spruce kraft pulp test sheet	160 (p. mill)	1.17	6790	0.50	(*34*)
Swedish kraft pulp test sheet	585 (beater)	1.08	7640	.63	(*34*)
Unbleached easy bleaching sulphite pulp test sheet	100 (p. mill)	.94	6665	.56	(*34*)
Pulp by chlorination test sheet	0	.70	2230	.31	(*28*)
	60 (p. mill)	.90	4000	.39	
Pulp by chlorine treatment test sheet	0	.55	4560	.41	(*34*)
	60 (p. mill)	1.01	10600	.64	
Cellophane	.....	1.20	4920	.81	(*34*)
Single fibers of upbeaten bleached sulphite pulp; fiber diam. = 0.05 mm.	0	...	6650	...	(*4*)
Single fibers of beaten unbleached sulphite pulp; fiber diam. = 0.02 mm.	360 (p. mill)	...	26800	...	(*4*)
Unbeaten spruce sulphite pulp test sheet, high pressure applied to wet sheet	0	...	11000	.50	(*14*)

[1] Ream size: 25x40—500.

A report by Simmonds and Baird (*31*) on some of the variables of processing presents a comparison of the effect of a pebble mill, a beater, and a resilient surfaced ball mill on a low-grade sulphite pulp in terms of average fiber length, fiber disintegration, and resultant sheet strength. The maximum bursting strength ratios obtained were 0.6 with the pebble mill, 0.81 with the beater, and 1.07 with the rubber-covered lead balls. The bursting strength ratio of the unbeaten pulp was 0.03. The percentage strength increase for the units in the above order was, than 1900, 2600, and 3500, respectively. The pebble milled pulp was highly fibrillated and the fibers excessively broken transversely. The beaten pulp was less so with the fibrillation consisting largely of fibrils completely separated from the fiber walls. The ball milled pulp was distinctly different in appearance, with a type of fibrillation that was more or less an open net-work of the outer layers of the cell wall accompanied by an underlying fiber skeleton which was longer than usually found with this degree of fibrillation.

It can be cited in the case of the ball milled pulp, for example, that during the first 50 minutes of milling, in which fibrillation was inappreciable, the percentage bursting strength increase was 1000, which is in agreement with Harrison's (*18*) observations that the major strength increase occurs before fibrillation begins. From this point to the end of the next 100 minutes the increase was 125 per cent. In the following 125-minute period, at the end of which the maximum bursting strength was attained, the percentage increase dropped off to 45 per cent. At this point fibrillation was pronounced. However, under nor-

mal papermaking conditions, it appears that, frequently, to meet strength specifications, fibrillation is the only means to attain a sufficiently high solid fraction in the finished sheet to yield the required strength.

Some investigators are adopting the hypothetical skin system of Lüdtke as a basic factor in theories of beating. A discussion of Lüdtke's views in conjunction with interpretations of previous work done on fiber microstructure done in this country is found in a recent paper by Ritter (*26*). Reference should be had to the article itself since the accompanying photomicrographs are essential to the discussion. Again, in regard to the effects of the presence of hemicelluloses in fibers in relation to physical "dissection," if mechanical processing may be so termed for the moment, it is of interest to note what has been observed relative to their effects in chemical dissection. The following is quoted from the paper cited above. "Wood fibers from which the lignin and the hemicelluloses have been removed can be easily dissected into their fibrils, provided they are not allowed to dry before the acid or alkaline dissecting agents are applied. Once these structural units of the more stable cellulosic materials shrink together through dehydration, extreme difficulty is experienced in dissection. This increased resistance of the cell wall to dissection is likely due to traces of hemicelluloses dispersed into fine particles which form during the alkaline or acid treatment for removing the carbohydrates and which become horny-like substance on subsequent drying. The result is a more resistant cementing substance between the fibrils and also the layers than was present in the original fibers. It is recognized that the increased resistance of dehydrated fibers to dissection may be explained on another basis. In case no interfibrillar cementing material was present in the chemically treated fibers, dehydration of those fibers would shrink their fibrils together to form between them (fibrils) molecular adhesive forces which would retard the re-entrance of chemical dissecting agents."

Most Recent Papers on Beating and Hydration

In 1933 an account of extensive experiments dealing with drainage, wet mat, and sheet properties of pulps and stuffs was presented by Bell (*2*), accompanied by a discussion of beating on the basis of the chemistry, minute structure, and colloidal properties of chemical wood pulp fibers. He points out that the idea persists that the main effect of beating, apart from purely mechanical fiber cutting and fibrillation, is the formation of some colloidal surface film on the water-wetted fibers which results in a fiber-fiber bonding when in sheet form. Evidence that beaten fibers sorb more water than unbeaten ones is meager but the sigmoidal shape of the vapor pressure isotherms and certain heat of wetting data suggest the existence of some form of cellulose-water bonding.

Drainage properties of pulp fibers were studied and compared with asbestos fibers by means of a flowmeter. In this device, a mat was formed on a wire screen under specified conditions and the drainage time for a given volume of liquid under decreasing head was observed. The ratio of the time to the weight of the pulp was termed the flow constant. Ethyl alcohol and also dilute aqueous solutions of electrolytes caused an increase in the rate of drainage. The effect of the alcohol is attributed to its dehydrating effect whereas effect of the electrolytes, largely dependent on the valence of the cation, is attributed to coagulation. The asbestos fibers were not affected by similar treatment.

A "cohesion number" determination was devised to measure the development of the "colloidal surface film" during beating. Essentially, this is the volume contraction upon drying of a standard pressed mat of wet pulp. The cohesion number equals 1000 [(wet vol./dry vol.)$^{-1}$] To determine the amount of the shrinkage due to the colloidal surface film a comparison can be made between pulp cakes dehydrated with alcohol and cakes of beaten asbestos fibers. Ionic coagulation and boiling the beaten pulp in water had a negligible effect on the cohesion number. The weight-volume relation was linear over a considerable range of moisture content. Beating degree cannot be satisfactorily measured by the retention of water under pressure, by a negative adsorption, or by a wet density method.

The strength properties, particularly bursting, of test sheets formed in gasoline, alcohol, and water from fibers beaten in these liquids corresponded to the results of the cohesion method. Satisfactory felting occurred in alcohol but the low strength of the resulting sheets indicated that the formation of the colloidal surface film requires the presence of water and a wet-pressing treatment.

The author concludes that in beaten fibers a chain of orientated water molecules link the active hydroxyl groups of the cohering cellulose micelles in such a way that the strength of cohesion depends on the shortness of the chain. Water alone can function as a dipole in this sense. Some obstacle exists to the formation of such a chain between unbeaten fibers. This may be the noncellulosic skin or membrane system described by Lüdtke.

In a later paper Bell (*3*) has elaborated in greater detail as to the special significance of Lüdtke's conception of fiber structure in the problem of "hydration" during beating.

Berg, (*4*), in a study of physical changes in fibers resulting from mechanical processing (pebble milling), determined the length-diameter ratio of the fibers, excluding fibrils, microscopically. With the bleached sulphite pulps used he found three cases for the ratio: it decreased continuously, decreased and approached a constant value, decreased and then increased. The last case was exhibited by the pulps made from slow growth woods. It was recognized that the microscopical method is especially unsatisfactory for determining fiber dimensions of a beaten pulp and so a sedimentation method was devised. In this procedure a suspension of fibers in 96 per cent ethyl alcohol was allowed to settle, the changes in concentration during sedimentation determined by the light absorption method of Hart, Mass., and Johnston, slightly modified, and the fiber dimensions calculated by the use of Stokes law modified according to Gans. The fiber length calculated from the sedimentation data differed considerably with that determined microscopically, whereas the width was in fair agreement. Berg is of the opinion that if sedimentation results cannot be used directly for calculating fiber dimensions, they at least illustrate very well the results of continuous beating. He also measured the tensile strength of single fibers before and after milling. The "unimpaired" fibers remaining after milling were used, the diameter for both unbeaten and beaten fibers being the average of microscopic measurements. Illustrative results of these determinations have already been quoted in Table I. The increase in strength of single fibers during beating is explained on the basis that the macroscopic structure has changed into a microscopic structure in which the weak points have disappeared due to a splitting at the weak points during the mechanical treatment. Fibers from slow-growth woods were found to be the stronger. Berg has divided the beating into three stages.

In a paper dealing with the sorption of water by cellulose, Sheppard and Newsome (*30*) show that such sorption is one means of characterizing the fine structure of the gel. They propose the theory that the sorption embodies two continuous stages or phases. The primary stage is represented by a surface (chemosorption) adsorption of

water on the free hydroxyl groups to which it is held by forces which are markedly greater than for the condensation of water vapor. This stage is mostly effective at low vapor pressures. The amount of water so adsorbed is much less than that calculated on the basis of the number of hydroxyl groups per hexose unit, hence all of such groups are not free in this sense. It also appears that this surface is not the apparent external or geometrical surface because if that were the case the amount adsorbed would be considerably less than it actually is. These facts establish an inner surface which bounds the totality of inner pores or capillaries in which fine gel structure water vapor is condensed. The other stage of sorption is a volume sorption, or capillary condensation as just indicated.

A portion of their data, given in Table II by which they call attention to the von Schroeder paradox, is of particular interest in this review. It is the fact that certain colloid systems in apparent equilibrium with 100 per cent relative humidity will take up considerably more water when placed in liquid water.

TABLE II
SORPTION OF WATER BY ALPHA-PULP AT 25 DEG. C.

Material	50 per cent relative humidity Per cent	100 per cent relative humidity Per cent	Liquid water Per cent
Free pulp from paper mill.....	6.5	21.8	113
Slow pulp from paper mill.....	6.8	21.7	106
Slow pulp ball-milled 4 hours, dehydrated with alcohol	...	24.3	...
Slow pulp ball-milled 4 hours, dried with water present	...	18.5	50
Slow pulp ball-milled 48 hours, dehydrated with alcohol	...	24.1	...

Sheppard and Newsome conclude that "hydration" has nothing to do either with a chemical hydration of cellulose or with any form of surface or volume sorption by the fibers but comprises effects depending upon increase of external surface or dispersity.

Clark's assay of the position (*11*) is essentially an acceptance of Campbell's views. He emphasizes the necessity of accounting for many of the effects of beating on the basis of fibrillation and the importance of explaining the adhesion of water-wetted fiber surfaces as a result of a true cellulose hydrate which probably amounts to less than one per cent of the cellulose. Experimental data are presented relative to: (1) the effect on drainage and sheet properties of boiling pulp in water before and after beating; (2) the adhesion of viscose strips with and without a moisture-proofing surface film.

The boiling treatment decreased the strength only slightly but decreased the wetness (measured by drainage time) 82 per cent from which it is concluded that water of imbibition and flexibility have much less influence in producing strength than is generally believed. The adhesive effect of the wetted surfaces is one of the more important factors.

When the surfaces of viscose strips were cleaned, moistened with water, and pressed together in a U-joint, with the grains parallel, almost as much force in tension was required to pull the joint apart as to rupture a single unjointed strip. The presence of a moisture-proof film almost destroyed the adhesion. The adhesion, which takes place in the absence of fibrils, is ascribed to linkages between hydroxyl groups in the surfaces of adjacent crystallites brought about through the water adsorbed thereon and surface tension affects when the water is removed. The presence of a cellulose hydrate offers a possibility of explaining this adhesion.

Mark (*21*) measures the surface "quality" and area of fibers by a water vapor sorption procedure using very low vapor pressures and several temperatures. The quality is measured in terms of sorption energy in calories per gram molecule of water. As a control experiment, artificial silk fibers cut to a definite length were passed through a colloid mill. A 40 per cent increase in surface area resulted, but, unless acid or alkali were present, no change in the sorption energy occurred. Similar runs were made with pulp fibers. In this case, the sorption energy was between 6,000 and 7,000 cal./g. mol. H_2O under mechanical treatment alone but was increased to 12,000 when combined with chemical treatment. Up to the present a real cellulose hydrate (water fixed at certain equilibrium positions in the lattice causing a distinct change in the intensities of the x-ray diffraction patterns) has not been identified but Mark believes something like that may exist.

Cottrall (*12*), on the basis of an interpretative review of the recent advances in the knowledge of cellulose and fiber structure, concluded that beating causes no increase in true hydration in the chemical sense but that such a hydrate does exist, amounting to less than 1 per cent, in both unbeaten and beaten fibers. The greater part of the strength of paper depends on the number of fiber-fiber contacts to form bonds through linkages of free hydroxyl groups. These contacts may be brought about by: (1) Simply pressing wet fiber webs, (2) by fibrillation (beating), (3) friction in a Lampén mill.

Harrison (*18*) considers the eight factors of primary importance on hydration, and paper formation and strength to be: felting, fibrillation, surface cohesion, plasticity, pliability, mucilage production, individual fiber strength, and the fiber length—diameter ratio. Between some of these there are no definite lines of demarkation. Felting is merely a means to an end since, as is indicated by satisfactory sheet formation, it simply enables the other factors to become operative. A general impression has arisen that fibrillation produces strength. The results given show that the Lampen mill produces a greater percentage increase in strength during the first five minutes of milling than at any later equal period. During this period of rapid strength development no fibrillation was observable. Later, when the rate of strength development is barely increasing fibrillation begins. Therefore, fibrillation alone is not responsible for strength.

Gartshore (*16*) has reported studies on the composition of furnish, freeness, and wetness. Stuffs were synthesized from kraft pulp and stuff, using untreated fibers, fibrillated fibers, and flour (isolated fibrils). The stuffs covered a range of freeness (Canadian Standard) but the bursting strength of the corresponding test sheets was unchanged. The flour largely controlled the freeness value. Mechanical pulps can have the same freeness as greaseproof stuff yet the two have very different running qualities on the machine. The most important criticism of the freeness tester is that the drainage quality of the stock is made between consistence limits of about 0.3 to 1 per cent, whereas the drainage quality of the stock may occur only at consistences higher than 1 per cent. Furthermore, the consistence on the machine wire from slice to couch for ordinary grades of paper is from approximately 0.3 to 17 per cent. Hence a wetness tester was devised in an attempt to work within the limits of the paper machine wire consistence and to embody the vacuum and time factors. The wetness figure, by means of which Gartshore proposes to distinguish between freeness and wetness within certain ranges of freeness, is the drainage time of a given volume of water under specified conditions. The curves given showing the relation between freeness and wetness values show that, for kraft stock, the freeness tester is the more sentitive from 600 to 350 cc. below which the wetness tester is the more sensitive. In the case of a newsprint furnish, the testers are equally sensitive from 150 to 70, below which the wetness tester is very sensitive.

In evaluating pulps, often an arbitrary freeness value

is selected and the time required to beat pulps to this value is used to differentiate between them. However, two pulps may have the same beating time but considerably different wetness values. For example, a kraft pulp was beaten to the same freeness as a news furnish (137 cc.) but the wetness values were 35 sec. for the kraft and 17 sec. for the news. This supplies the reason for the fact that whereas a beaten kraft pulp may have a higher freeness than a news furnish, the kraft usually must be run slower on the machine.

Edge (*15*) has contributed an interesting note on the relation of fibrillation to the increase in strength on beating. A sample of unbleached easy bleaching sulphite pulp was Lampén milled in water, the resultant stuff having sheet properties as shown in the following tabulation. A second portion was soaked in toluene, disintegrated in toluene, and milled in toluene. After evaporation of the toluene by air-drying, the pulp was soaked several hours in water prior to sheet formation. Photomicrographs show the fibers to be in a "fibrillose" condition. The respective sheet properties were:

	Bursting strength factor	Tearing strength factor	Breaking length factor	Absorbency	Porosity	Shrinkage
Milled in water..	80	197	19	3	1.6	9.6
Milled in toluene	9.6	77	3	28	25.0	2.5

These facts "cut across every theory so far advanced for the development of strength on beating."

Campbell's most recent paper (*8*), in which his fibrillation and crystalline bond hypothesis is reviewed, deals with the established facts of fiber structure and an interpretation of papermaking operations and results in terms of such structure. He conceives of a molecular structure of cellulose in which groups of principal valence chains are not set apart in an ordered brick-like structure as in the micellar theory but branch from one region of high density to another. Sheppard and Newsome (*30*) incline to this point of view also.

One of the many important facts which the previous sorption experiments (*6*) yielded was that the relation between liquid volumes sorbed and the internal liquid tension at the several vapor pressures showed practically the same volumes of water, methyl, and propyl alcohol sorbed over most of the range. It is indicated that the force required to distort or collapse the cellulose structure is the factor common to the several sorption reactions. These findings have brought a fresh point of view to the swelling and shrinking of gels from which it is concluded that the wet and swollen state of cellulose rather than the dry is the natural or unstrained state.

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Demand Salt Cake Excise Tax

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935.—An amendment to the tax bill, now before the Ways and Means Committee to save the American natural salt cake industry from extinction by foreign competition has been offered by six members of the House of Representatives. The proposed tax would place an excise duty of $5.50 per ton on imported sodium sulphate, which is at present on the free list.

The members of Congress sponsoring this move are: Representative Isabella Greenway, of Arizona; Representative William Lemke, of North Dakota; Representative Numa F. Montet, of Louisiana; Representative Abe Murdock, of Utah; Representative James G. Scrugham, of Nevada; Representative R. Ewing Thomason, of Texas.

"Although the United States can easily supply the entire demand for sodium sulphate," said Representative Greenway, of Arizona, "American producers are now only filling about half of that demand and these companies will be out of business in the near future unless this relief is afforded."

Representative William Lemke, of North Dakota, pledged his support to the proposed excise tax on natural salt cake, and declared "I intend to do what I can to preserve the American market against the products of cheap foreign labor."

"It is pure folly for the spokesmen of the Government to continually request the aid of business in an effort to bring back prosperity," declared Representative James G. Scrugham, of Nevada, "while American industry is left at the tender mercy of unfair foreign competition.

Declaring that the American salt cake industry is being driven to the wall by foreign competition, Representative Numa F. Montet, of Louisiana, declared that "The only manner in which this can be stopped is for Congress to place a reasonably heavy excise tax on the foreign commodity."

"It is no longer profitable for the domestic manufacturer of natural salt cake to produce salt cake in the face of the ever increasing flood of foreign imports" declared Representative Abe Murdock, of Utah. "If this industry is to continue to exist reasonable protection in the form of an excise tax on foreign salt cake is absolutely mandatory."

"Imports from foreign countries where there is cheap labor, is about to put this essential industry out of business. The manufacturers of salt cake are entitled to an excise tax that will give them fair competition against foreign manufacturers," declared Representative R. Ewing Thomason, of Texas. "This bill has merit and I expect to do all I can to aid in its passage."

The Internal Structure of Paper

A. J. Bailey[1]

The empirical art of paper making has run far ahead of the science; even today paper is fabricated by an essentially empirical process, and the structure and the minute physical and chemical relations of the finished sheet have not been satisfactorily established, yet anisotropy in paper is of sufficient commercial importance to warrant careful study. Aeolotropic strength, elasticity, shrinkage, and dissimilitude of surfaces have demanded explanations which empiricism, due to its inherent limitations, could not supply. While many scientific devices and techniques have been proposed to measure these differences and explain the causes, they have usually measured mass effects with the result that the values obtained have been in terms of average rather than of individual quantities. Measures of smoothness by friction *(2)* ink penetration and opacity by optical characteristics *(2, 3)*, porosity by gas permeation *(1)*, and strength tests and capillary rise of water in different directions of a sheet *(8)* are examples of the measurement of mass effects. Unfortunately, these mass

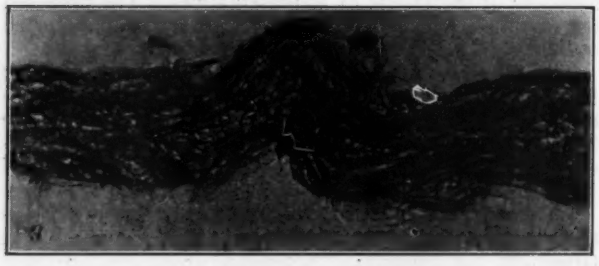

FIG. 1
Photomicrograph of sulphite paper cross-section through a fold (folded 20 times by hand), machine direction in plane of paper, section 40 u thick, magnification 190 diameters.

measurements give but little information concerning the intimate details of sheet structure or of the causes of the differences. Obviously, these data must be derived from a study of the minute details of the structure of the sheet itself.

An examination of thin cross-sections of various papers

[1] Junior Member TAPPI, College of Forestry, University of Washington, Seattle, Wash.

FIG. 2
Cross-section through a fold in newspaper (folded 20 times by hand), machine direction in plane of paper, note separation of fibers due to poor bonding as compared to Fig. 1, section 40 u thick, magnification 150 diameters.

demonstrated that the fiber itself and the nature of the fiber to fiber bond apparently are the important strength factors. In comparing kraft with soda paper, for example, it was found that fibers in the former were straight, elastic, relatively unfibrillated, and retained most of their original morphological characteristics, while in soda paper

FIG. 3
Cross-section of newspaper, machine direction in plane of paper, note ink on surface, section 40 u thick, magnification 190 diameters.

the fibers seemed to be lacking in elasticity, frequently occurring in bent and twisted positions, and usually having lost virtually all of the structural traits of the original fiber, being commonly degenerated to a frayed mass with little integral strength. In general, fibrillation, considered alone, seems to be indicative of weakness, coincident with loss of structure.

Possible explanations may be that the effective contact area of fibrils cemented by cellulose mucilage is less than the original contact area held together by secondary valence, or, that the original forces of residual valence are greater than the adhesive forces of cellulose mucilage plus any incidental secondary valence, for equal areas of contact. Fibrillation is usually more advanced in weak paper such as that made by the soda process, due perhaps to the chemical removal of fiber components which impart intra-fiber cohesion with resultant strength, elasticity, and tenacity. Interlacing of fibrils seems to be far less common than is generally believed, while fiber interlacing is by no means general or uniform in occurrence. The alignment of fibers may be extremely erratic and is frequently grouped, i.e., in one location they may lie in one direction while immediately adjacent to this they may be at right angles to this direction, suggestive of a confluence of pulp deposited on the wire. In general, in agreement with well accepted beliefs, the fibers tend to lie with their long axes parallel to the machine direction, with exceptions as noted.

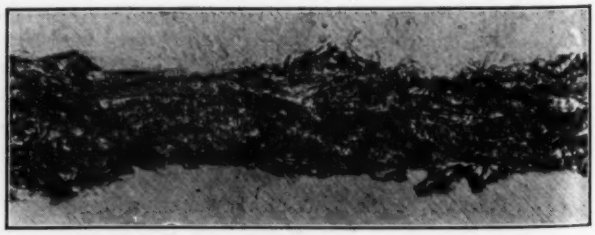

FIG. 4
Cross-section of newspaper, machine direction perpendicular to plane of paper compare with Fig. 3, section 40 u thick, magnification 190 diameters.

Fiber Bonding

In contrast to the weakness imparted by fibrillation is the strength contributed by strong fiber bonding. As is well known, beating produces fibrillation and colloidal surfaces, together with other effects; from this study it appeared that if surface gelatination had proceeded without excessive fibrillation, firmly cemented, rigid, and morphologically intact fibers resulted, causing a strong sheet. In other words, if the fiber itself and its treatment before beating had been of such a nature as to permit retention of normal rigidity, tenacity, and cohesion, gelatination had proceeded without excessive fibrillation and loss of structure, concomitant with loss of inherent strength. The resulting sheet, then, had strong fibers of relatively unchanged orientation of crystallites in the core, bound together by strong colloidal unions, approaching the specifications of Minor's ideal fiber *(6)*. The importance of the strength of bonding and the flexibility of fibers and fiber unions is shown by a fold in sulphite paper in Fig. 1. Further evidence of the importance of good bonding was

FIG. 5
Cross-section of kraft paper, machine direction in plane of paper, compare with Fig. 3, section 40 u thick, magnification 190 diameters.

shown by a kraft paper which had characteristics which seemed to indicate that the residual liquor, often in sufficient quantities to form a black deposit on the interiors of the fibers, might strengthen the fiber to fiber bond. In contrast to this, soda paper showed very poor bonding as well as degeneration of structure.

Lund has suggested that fibers strike the wire on end and that the shake whips the free end sideways, while the difference in velocity of the stock and wire tends to cause alignment in the machine direction *(5)*. Only in rare cases, however, was it possible to observe ends of fibers in this position relative to the rest of the sheet. Fiber alignment in the machine direction seemed to be quite common, particularly on the felt side of the sheet. The wire side of the sheet, however, showed more heterogeneous alignment, due probably to the formation of a mat of fibers in the random arrangement in which they apparently strike the wire with maintenance in this position enforced by friction with the wire caused by the force of the draining water and the superimposed pulp. The alignment of the fibers on the felt side with the machine direction is easily explained by the difference in velocity between stock flow and wire. Examples of difference in alignment in the machine and cross directions are shown in Figs. 3 to 6.

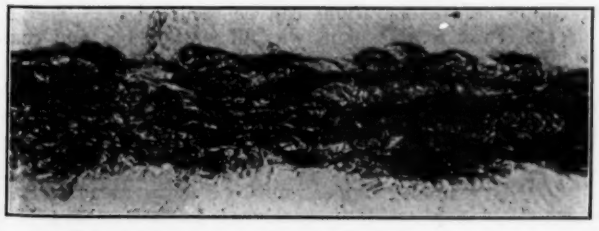

FIG. 6
Cross-section of kraft paper, machine direction perpendicular to plane of paper, compare Figs. 3 and 5, also 4 and 6, then contrast 3 and 5 with 4 and 6 to show differences between machine and cross directions, section 40 u thick, magnification 190 diameters.

FIG. 7
Cross-section of kraft paper, machine direction perpendicular to plane of paper, high contrast to illustrate bridging of stiff fibers causing porosity, section 40 u thick, magnification 215 diameters.

(Note: It should be noted that illustrations are not intended to represent average conditions but are presented to point out specific characteristics.)

Most papers, particularly the thicker types, showed definite two-sidedness due to sedimentation. It was common to find the larger fibers on the wire side with progressively more slowly settling fibers and fine material superimposed. Consequently, the felt side was composed of large and small fragments fitted into a smooth surface, in a manner similar to the stratification of gravel and sand deposited by water, while the wire side was composed chiefly of large intact fibers. Considerable fine material is apparently lost through the wire before a mat forms or perhaps settles more slowly than large fibers so that it is deposited on the felt side. The imprint of the wire on the paper, another possible cause of the surface differences in the two sides of a sheet, could not be detected as having any significant influence in any of the papers studied.

Porosity

Great differences in porosity in different papers were apparent; the chief cause seemed to be the stiffness of fibers, resulting in a bridging effect (see Fig. 7) by fibers in common alignment crossing other fibers which were at right angles to the general fiber alignment in that portion

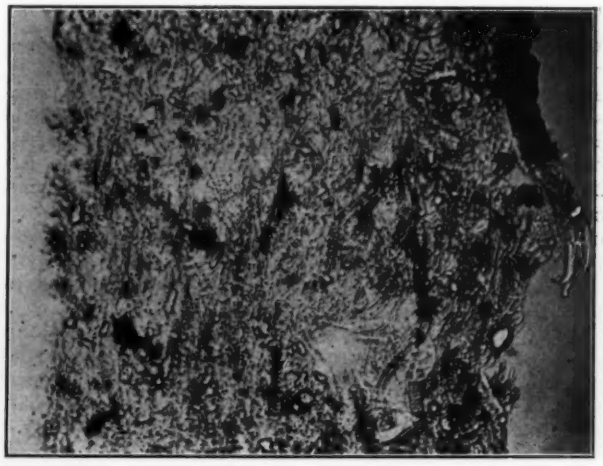

FIG. 8
Cross-section of blotting paper, note ink on surface and occurrence of filler in the sheet, section 40 u thick, magnification 140 diameters.

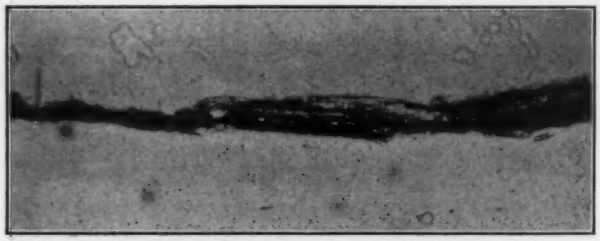

FIG. 9
Cross-section of tissue paper showing a uniseriate medullary ray, section 40 u thick, magnification 140 diameters.

of the sheet. Soft well-beaten fibers seemed to be collapsed and lacking in elasticity, and matted into a fairly uniform sheet with few discontinuities. On the other hand, the stiff hard fibers of kraft paper were often permanently compressed if they occurred on the surface, while on the interior, cross-sections of fiber lumens had an approximately circular or elliptical shape, although they had the appearance of having been crushed by the calender stack and having returned to an almost normal position.

Rau claims that ink penetrates into spongy or uncoated papers *(7)* while Leupold believes that most of the ink is filtered out on the surface and that the ink vehicle may penetrate *(4)*. On the contrary, however, even with sections of blotting papers (as well as other types) not exposed to any agent which might remove pigment or vehicle or change the inter-fiber relations, the ink seemed, in all papers studied, to be deposited entirely on the surface as Figs. 3 and 8 show. It must be remembered, however, that thin transparent films are usually invisible at higher magnifications.

An interesting item regarding the resistance of lignin toward digestion was shown by uniseriate medullary rays (Fig. 9) which occurred commonly in many papers, retaining their original integrity in spite of digestion and beating, causing a "shiner" in the finished sheet.

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Filmslides for Record Material

In the article "Are We Ready to Preserve Newspapers on Films", The Library Quarterly, April, 1935, Dr. A. F. Kuhlman, of the University of Chicago Libraries, presents an excellent discussion of the subject. This article is timely because of the widespread interest in the possibilities of filmslides, including sound reproduction, for both producing and reproducing records for library and other educational uses. The article embodies the opinions of librarians and others well qualified to answer the question, and based on their statements the following very complete summary of the present situation is quoted in part.

"Fortunately, the Carnegie Foundation has made a grant to enable the Bureau of Standards to begin the scientific study of the stability of the film. It is hoped that the Bureau will be able to render, within this year, an authoritative statement based upon its findings.

Thus, to summarize, before we can say we are ready to preserve newspapers in film form, dependable and favorable answers must be found to a series of unsolved problems. First, the Bureau of Standards must settle the question of the life-expectancy of the film record. This presents an intricate problem of many variables. The Bureau must determine (1) the chemical and physical properties of the cellulose acetate film and of the emulsion and image produced upon it in filming records; (2) specifications for producing and processing the film to obtain the most usable and durable product; (3) the effect upon the film copy, while in use or storage, or various environmental conditions—temperature, humidity, light, human contact, etc.; and (4) specifications for storage and use. These points determined, it should become possible to predict, on the strength of verified data, the life-expectancy of the film if produced, processed, stored, and used under clearly specified conditions.

A corollary of this study is the problem of discovering and producing fine-grained films and of processing them so as to secure sharp-cut reproductions to cope with extraordinary problems presented by old, oversized, stained pages of fine print. Another corollary study consists of determining the merits and limitations of various cameras now available. Two closely related problems calling for verified data concern the feasibility of making and employing miniature prints of newspapers, and the stability of sound recordings on wax, composition, and metal-alloy disks.

Second, the determination of the merits of various types of projectors presents problems upon which libraries should have tested data from an impartial agency such as the Bureau of Standards. Eyestrain and the use of ineffective equipment should be prevented. It should not be left to individual libraries to discover by trial and error the merits or limitations of the projectors now on the market, or, because of the high prices of projectors, to improvise ill-adapted equipment.

Thus, it would seem that the test to determine the feasibility of filming records is a crucial one. Its outcome, if favorable, may revolutionize the designing and construction of library buildings and equipment, vastly modify the interlibrary organization of the world, and have a profound effect upon the scholarship of the future. It should settle the momentous question of whether in film copy this generation will rediscover a practical medium through which the records of our present and past civilizations can be preserved."

Mohawk Valley Paper Closed by Storm

LITTLE FALLS, N. Y., July 13, 1935—The electrical storm which passed over this city shortly after 3 Monday afternoon did thousands of dollars of damage.

At the plant of the Mohawk Valley Paper Company two creeks on the north side of West Main Street overflowed. A torrent of water shot across the street to the plant, covering the basement to the depth of about seven feet, putting the boiler fires out, and stopping the motors thereby halting operations at the plant. It will be several days before operations can be resumed.

A driveway to this plant was all washed out and coal in the boiler room was washed out.

The 100 or more ERA gardens of local residents on the river flats, use of which Charles H. Burrows donated, were completely under water and destroyed.

W. Gordon Mitchell Made Technical Adviser

W. Gordon Mitchell, formerly of Price Brothers, has been appointed technical adviser to the Joint Administrative Committee of the Pulp and Paper Research Institute in Montreal. This position has been vacant since O. S. Bryant died several years ago.

To Develop Labrador Timber Resources

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., July 15, 1935—A despatch from London states that the British Government has made a grant of $200,000 to the Labrador Development Company, of which J. C. Williams is president, for development of timber resources in Laborador. The matter was recently discussed in the House of Commons, where William Lunn, Labor, made allegations against Williams' financial reputation and asked whether the present trade commissioner for Newfoundland in London, a former partner of Williams, had any interest in the company.

The Government spokesman replied that the question of the grant had been decided and the Governor of Newfoundland had informed him Williams had never been declared bankrupt nor had any bankruptcy proceedings ever been taken against him or against companies which he was concerned with, though certain companies with which he had been associated went into voluntary liquidation in 1918 and 1926.

The loan had been advanced subject to stringent safeguards, it was added. One of the commissioners would represent the Newfoundland Government on the board of the company, thereby placing the Government in effective control of the undertaking during currency of the loan.

The Government spokesman said in answer to further questions that they were prepared to discuss the matter with Lunn if the latter could show information from Newfoundland business men containing any information the Government did not already have. The Government however was satisfied, 80 per cent of the shares in the company having been transferred to the Government as security, in addition to the whole of the shares of Williams, Ltd., of Cardiff.

Argentina Paper Imports Gain

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—Arrivals of paper and paper products in Argentina during May showed a conservative upward trend compared both with the previous month or with May, 1934, according to recent reports from Assistant Trade Commissioner DuWayne G. Clark, Buenos Aires. In only two classes, printing paper and wood pulp, were the quantities considerably lower than during the corresponding month last year. In this connection it must be borne in mind that imports during May, 1934 were far above normal, and were partly responsible for the accumulation of stocks now being worked off. The same condition obtained in other classes, but indications are now that the excess supplies have been very largely moved out of the warehouses and that imports in future will more truly represent the level of local consumption.

Estimates computed upon the basis of published ship's manifests indicate that arrivals of wrapping paper during May totaled some 1,203 short tons compared with 548 tons during April; arrivals of newsprint are estimated at 8,649 tons as against 4,815 tons during April; arrivals of other printing papers at 229 tons as against 167 tons during April; and arrivals of boards at 1,567 tons as against 790 tons in April.

Imports of these same classes during May, 1934, were as follows: wrapping paper 534 tons; newsprint 8,958 tons; printing paper 2,418 tons; and boards 1,058 tons. Among miscellaneous arrivals during May were 50 boxes of blotting paper from the United States; 77 bales and 4 boxes of wall paper from the Netherlands, Germany, the United Kingdom and Belgium; and 209 boxes and 16 bales of writing paper.

Safety Congress To Meet at Louisville

The 24th Annual Safety Congress and Exposition of the National Safety Council will be held in Louisville, Kentucky, October 14-18 inclusive.

The 120 meetings are scheduled for the Brown, Seelbach and Kentucky Hotels; the exhibits of safety equipment will be in the Brown and Seelbach. The approximate division of sessions will be: 100 on industrial safety and 20 on public safety. To meet the growing popularity of special subject sessions twelve or more of these meetings will be held.

Many prominent men have already accepted invitations to speak. On Monday, October 14, J. M. Conway, president of the Hoberg Paper and Fibre Company, will address members of the Paper and Pulp Section on the subject, "Psychology of Safety from the Management's Viewpoint."

All sectional meetings arrange for discussional periods for the exchanging of experiences on any phase of safety.

Reduced railroad fare certificates (1-1/3 fare for round trip) are available for delegates and may be secured upon request to Council Headquarters. Reservations are now being received.

Dumping of Novel Newsprint Heard

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935.—Commissioner of Customs Moyle conducted a hearing on Wednesday, July 10, on the complaint of the Import Committee of the American Paper Industry against the dumping of novel newsprint from Canada and Finland. The hearing was to determine the extent of injury being done by imports of this paper to the American producers, Customs officials stating that the sales by Canadian mills were at such prices as to constitute dumping if injury were proven. Witnesses for the domestic industry were R. E. Canfield, executive manager of the Groundwood Paper Manufacturers Association and Samuel Pruyn of Finch, Pruyn & Company, Glens Falls, N. Y. C. E. Whitney, counsel, and Warren B. Bullock, manager, were also present representing the Import Committee. Jay Madden of New York appeared on behalf of the importers of the Finnish paper, and S. J. Peet on behalf of the users of Canadian paper. Commissioner Moyle reserved decision on the issue.

Government Paper Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—M. S. Ginn & Co. has been awarded the contract for furnishing the Government Printing Office with 10,000 sheets of 22 x 28 gray photo mount board at $32.80 per M sheets, bids for which were received on June 26.

Z. & W. M. Crane, Inc., will furnish 5,000 sheets of 100 per cent rag white writing paper, 4-7/8 x 7-7/8" at $32.50 per M sheets, bids for which were received on June 21.

The United Supply Company will furnish 13,000 pounds of No. 1 gummed kraft paper at 6 cents per pound less 2-1/8 per cent, bids for which were received on June 26.

The Russell Products Company will furnish 500 pounds of facing stereo tissue paper in 24 inch rolls at 83 cents per pound, bids for which were received on July 1.

C. K. Urquart, Jr. Goes With Milton Paper Co.

C. K. Urquart, Jr., recently of the Urquart Paper Company, Inc., has joined the Milton Paper Company, Inc., 119-125 West 24 street, New York.

New TAPPI Members

The executive committee of the Technical Association of the Pulp and Paper Industry announce that the following have been elected to membership.

Charles Champion, Mill Manager, Millers Falls Paper Company, Millers Falls, Mass. Mr. Champion is president of the American Pulp and Paper Mill Superintendents Association and was formerly superintendent of the Byron Weston Company and the Berkshire Hills Paper Company.

Charles C. Stewart II, President of C. C. Stewart Paper Company Inc., Philadelphia, Pa. and was formerly superintendent of the Newton Falls Paper Company, Newton Falls, N. Y. and the American Writing Paper Company, Holyoke, Mass.

Charles A. Sankey, research engineer, Ontario Paper Company, Thorold, Ontario is a graduate of the University of Toronto and received his Ph. D. from McGill University. Dr. Sankey was recently with Price Bros. Company Ltd., of Quebec, P. Q.

Teddy R. Moore, Assistant Pulp Mill Superintendent, Brown Paper Mill Company, Monroe, La., was formerly engineer for the J. O. Ross Engineering Corporation of New York.

Horace Freeman, technical director, Consolidated Paper Corporation Ltd., Three Rivers, P. Q. and vice president, Nichols Engineering and Research Corporation, New York, is a graduate of the Technical College, Birmingham, England. Mr. Freeman is well known as a research chemist and metallurgist in Canada and Great Britain, and is the inventor of a number of processes including the electric furnace manufacture of sodium sulphide, a pyrite burning furnace and a method of making cyanide from atmospheric nitrogen.

Victor I. Gruenman, consulting engineer temporarily with V. De Montgolfier, Charavines, Isere, France, is a graduate of the University of St. Petersburg, Russia and Battersea Technical School, England, and has been manager of mills in Russia and Estonia.

John F. Acer, Secretary, Acker, McLernon & Co. Ltd., Montreal, P. Q. is a 1925 graduate of the Royal Military College of Canada.

Ernest Bakewell, Member of Standing Committee on Forestry, Legislature Assembly of British Columbia, is a 1922 graduate of the University of London, and was formerly chemist for Pacific Mills Ltd., Ocean Falls, B. C.

F. George L. Becker, Director, Becker & Co., Ltd., London, England, is a graduate of Cambridge University, England, and was formerly director of the British Bewoid Company, Oxford, England.

B. Eric J. Diedrichs, Chemical Engineer, Mo och Domjo A/B, Husum, Sweden, is a 1928 graduate of the Technical University of Stockholm and was formerly with the Sanvik Steel Works, Sanvik, Sweden and Assistant Sulphite Superintendent, International Paper Company, New York.

Norman S. Grant, Chief Chemist, Great Lakes Paper Company, Fort William, Ontario is a 1923 graduate of the University of Toronto and was formerly with the Minnesota and Ontario Paper Company, International Falls, Minn., and the Kenora Paper Mills of Kenora, Ontario.

Iver Sjostrom, Sales Manager, Hoganas-Billesholms A/B, Hoganas, Sweden, is a 1916 graduate of the Technological Institute of Stockholm.

William J. White, Chemist, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich. is a 1934 graduate of the University of Maine. Mr. White has worked for the Chillicothe Paper Company, Chillicothe, Ohio and the Munising Paper Company of Munising, Mich.

Frederic S. Klein, Papermaking Apprentice, Collins Manufacturing Company, N. Wilbraham, Mass. attended the University of Pennsylvania.

J. Edmund Becker, student, New York State College of Forestry, Syracuse, N. Y.

George B. Martin, Technical Salesman, General Dyestuff Company, Philadelphia, Pa. is a 1927 graduate of the New York State College of Forestry and has worked for the Lincoln Paper Mills, Merritton, Ont.; the Daily News Paper Company of N. Tonawanda, N. Y. and the Scott Paper Company of Chester, Pa.

Guy A. Baker, Sales Engineer in charge of corrosion resistant alloy steel for the Duriron Company, Dayton, Ohio. Mr. Baker was formerly assistant works manager of the Dayton Steel Foundry, Dayton.

William J. Burke, Chemist, General Dyestuffs Company, New York, attended Massachusetts State College, Amherst, Mass., and was formerly pulp chemist for the American Writing Paper Company, Holyoke, Mass.

Francis H. Snyder, President, Francis H. Snyder Inc., attended Syracuse University and was formerly research chemist for the Hooker Electrochemical Company, Niagara Falls, N. Y. Mr. Snyder is one of the inventors of the Snyder-Maclaren deinking process.

Frederick G. Barber, graduate student, New York State College of Forestry, formerly worked for the Munising Paper Company, Munising, Mich.

William E. Davis, recent graduate of New York State College of Forestry is now with the Dow Chemical Company of Midland, Mich.

James W. Merrill, is a graduate of the Massachusetts State College and has worked for the Valley Paper Company, Holyoke, Mass.

Lewis Muscat, manager, New York Branch of R. Fuess Inc., testing instrument manufacturers.

Murray M. Rubin, Chemist, Fraser Companies Ltd., Madawaska, Maine, has been elected to Active membership in the Technical Association.

Myron G. Kuhlman, Chemist, Peavey Paper Products Company, Ladysmith, Wis. is a 1934 graduate of the University of Wisconsin and has worked for the Marathon Paper Mills, Rothschild, Wis.

Erland Waldenstrom, Chemical Engineer, Korsnas Sagverks A/B, Gefle, Sweden, is a 1933 graduate of the Royal Technical Institute, Stockholm, Sweden. During 1934-1935 Mr. Waldenstrom studied paper manufacture in various mills in the United States.

A. J. Bailey, graduate student, College of Forestry, University of Washington, Seattle, Wash.

Harry L. Taylor, Buying Director of E. S. & A. Robinson Ltd. and its subsidiary mills and companies, Bristol, England.

Geoffrey Duxbury, Draughtsman, Yates Duxbury & Sons Ltd., Heap Bridge Paper Mills, Bury, Lancs., England, is a graduate of Loughborough Engineering College, England.

Veni Oleskevich, Chief Chemist, Abitibi Power and Paper Company Ltd., Smooth Rock Falls, Ontario is a 1932 graduate of McGill University and was formerly with Fraser Companies Ltd., Chatham, N. B.

Netherlands Increases Pulp Imports

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 17, 1935—Imports of wood pulp into the Netherlands increased about 25 per cent over the first four months last year, additional amounts of groundwood and sulphate pulp having been received, while receipts of sulphite decreased.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING JULY 13, 1935

CIGARETTE PAPER

H. H. Strauss, Indep. Hall, Bordeaux, 472 cs.; Standard Products Corp., Manhattan, Havre, 49 cs.; R. J. Reynolds, Tobacco Co., Manhattan, Havre, 25 cs.; De Mauduit Paper Corp., Manhattan, Havre, 175 cs.

WALL PAPER

———, Manhattan, Havre, 11 cs.

NEWSPRINT

———, Bergensfjord, Oslo, 334 rolls; Jay Madden Corp., Manhattan, Hamburg, 136 rolls; Bank of Montreal, Humberarm, Cornerbrook, 2105 rolls.

PRINTING PAPER

International F'd'g. Co., H. Jasper, Antwerp, 4 cs.; S. H. Pomerance, Georgic, Liverpool, 1 cs.; ———, Georgic, Liverpool, 16 rolls; E. Dietzgen & Co., Veendam, Rotterdam, 3 cs.; E. Dietzgen & Co., New York, Hamburg, 3 cs.; Senefelder Co. Inc., New York, Hamburg, 19 cs.

WRAPPING PAPER

Keller Dorian Paper Co., Exeter, Marseilles, 3 cs.; F. C. Strype, Black Heron, Antwerp, 2 cs.

FILTER PAPER

H. Reeve Angel & Co. Inc., American Trader, London, 6 cs.; J. Manheimer, Acquitania, Southampton, 102 bls.

SURFACE COATED PAPERS

Gevaert Co. of America, Black Heron, Atwerp, 21 cs.

TRANSFER PAPER

Atlantic F'd'g. Co., New York, Hamburg, 13 cs.

PHOTO PAPER

J. J. Gavin, Acquitania, Southampton, 8 cs.

TISSUE PAPER

F. C. Strype, Samaria, Liverpool, 4 cs.; B. F. Drakenfeld & Co., Samaria, Liverpool, 6 cs.; W. J. Byrnes, Acquitania, Southampton, 4 cs.

COLORED PAPER

International F'd'g. Co., New York, Hamburg, 55 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Samaria, Liverpool, 15 cs. (duplex); B. F. Drakenfeld & Co., Samaria, Liverpool, 3 cs. (simplex).

DECALCOMANIAS

I. Consmiller, New York, Hamburg, 4 cs.

MARBLE PAPER

Tamm & Co., H. Jaspar, Antwerp, 1 cs.

STENCIL PAPER

———, American Trader, London, 1 cs.; American Express Co., Acquitania, Southampton, 1 cs.; C. Happel, Black Heron, Antwerp, 1 cs.

BOWL PAPER

Hurley Johnson Corp.; Samaria, Liverpool, 28 bls.

TRACING CLOTH PAPER

C. Bruning Co. Inc., Manhattan, Hamburg, 24 cs.

ENVELOPES

Japan Paper Co., Georgic, Liverpool, 2 cs.

LITHO PAPER

B. Meiners, Inc., City of Dalhart, Hong Kong, 11 cs.

MISCELLANEOUS PAPER.

Coty Processing Co., Normandie, Havre, 5 cs.; International Hatters Supply Co., Exeter, Genoa, 2 cs.; Keuffel & Esser Co., Manhattan, Hamburg, 27 cs.; Japan Paper Co., Chastine, Maersk Kobe, 33 cs.; Corn Exchange Bank Trust Co., Katsuragi Maru, Yokohama, 56 cs.; U. S. Envelope Co., Katsuragi Maru, Yokohama, 43 cs.; S. S. Kresge Co., Waukegan, Havre, 3 cs.

RAGS, BAGGINGS, ETC.

Royal Manfg. Co., H. Jaspar, Antwerp, 93 bls. cotton waste; E. J. Keller Co. Inc., Tonsbergfjord, ———, 140 bls. paper stock; E. J. Keller Co. Inc., Indep. Hall, ———, 694 bls rags: Amtorg Trading Corp., Kim Leningrad, 321 bls. flax waste; Amtorg Trading Corp., Kim, Leningrad, 2244 bls. rags; Darmstadt Scott & Courtney, Veendam, Rotterdam, 100 bls. bagging; American Express Co., Black Gull, Rotterdam, 206 bls. rags; E. J. Keller Co. Inc., Black Gull, ———, 230 bls. rags; ———, Exeter, Alexandria, 115 bls. rags; E. J. Keller Co. Inc., Exeter, ———, 100 bls. rags; Darmstadt Scott & Courtney, Exeter, Genoa, 55 bls. rags; N. Schwab & Son, Black Heron, Antwerp, 90 bls. cotton waste; D. M. Hicks, Inc., Black Heron, Antwerp, 36 bls. flax waste; Irving Trust Co., Black Heron, Antwerp, 62 bls. bagging; W. Steck & Co., Black Heron, Antwerp, 79 bls. rags; E. J. Keller Co. Inc., Waukegan, ———, 11 bls. rags; Royal Manfg. Co., Waukegan, Dunkirk, 62 bls. cotton waste; D. M. Hicks, Inc., Waukegan, Dunkirk, 21 bls. new cuttings.

OLD ROPE

Banco Coml. Italiane Trust Co., Georgic, Liverpool, 65 bls.; Banco Coml. Italiane Trust Co., Veendam, Rotterdam, 81 coils.

CASEIN

Swift & Co., Eastern Prince, B. Ayres, 325 bags.

WOOD PULP

Irving Trust Co., Bergensfjord, Oslo, 2500 bls. mechanical pulp; Chemical Bank Trust Co., Bergensfjord,

Oslo, 120 bls. sulphite; E. M. Sergeant Pulp & Chemical Co., Bergensfjord, Oslo, 150 bls. chemical pulp; J. Andersen & Co., Bergensfjord, Greaker, 1585 bls. sulphite; Perkins Goodwin & Co., Bergensfjord, Drammen, 500 bls. sulphite; ———, Bergensfjord, Sarpsborg, 300 bls. sulphite; The Borregaard Co. Inc., Bergensfjord, Sarpsborg, 840 bls. dry pulp; A. Giese & Son, Veendam, Rotterdam, 50 bls. wood pulp; ———, Black Gull, Rotterdam, 330 bls. wood pulp 65 tons; Perkins Goodwin & Co., Ragnhildsholm, Sweden, 2400 bls. sulphate; Perkins Goodwin & Co., Ragnhildsholm, Sweden 900 bls. sulphite; Price & Pierce, Ltd., Ragnhildsholm, Sweden, 1500 bls. sulphite; Price & Pierce, Ltd., Ragnhildsholm, Sweden, 150 bls. sulphate; ———, Ragnhildsholm, Sweden, 250 bls. chemical pulp; ———, Ragnhildsholm, Sweden, 125 bls. sulphite; Tradesmans Nat'l Bank Trust Co., Ragnhildsholm, Sweden, 875 bls. sulphate; Johaneson Wales & Sparre, Inc., Manhattan, Hamburg, 334 bls. wood pulp 50 tons; ———, Manhattan, Hamburg, 210 bls. wood pulp 22 tons; Bank of N. Y. Trust Co., New York, Hamburg, 120 bls wood pulp 24 tons; Castle & Overton, Inc., New York, Hamburg, 1270 bls. wood pulp 254 tons; Bulkley Dunton & Co., Sagoporack, ———, 250 bls. wood pulp.

WOOD PULP BOARDS

Griffin Rutgers, Inc., New York, Hamburg, 50 cases; ———, New York, Hamburg, 13 bls.

NEWARK IMPORTS

WEEK ENDING JULY 13, 1935

H. G. Craig Co., Donnacona 1, Montreal, 534 rolls newsprint.

ALBANY IMPORTS

WEEK ENDING JULY 13, 1935

Perkins Goodwin & Co., Troubadour, Tofte, 800 bls. sulphite; Atterbury Bros. Inc., Troubadour, Tofte, 6000 bls. sulphite; ———, Troubadour, Greaker, 600 bls. sulphite; Price & Pierce, Ltd., Troubadour, Greaker, 1560 bls. sulphite; International Paper Co., Haulegg, Gaspe, 1171 cords pulp wood.

PORTLAND IMPORTS

WEEK ENDING JULY 13, 1935

Bulkley Dunton & Co., Ragnhildsholm, ———, 3050 bls. wood pulp.

BOSTON IMPORTS

WEEK ENDING JULY 13, 1935

———, Samaria, Liverpool, 422 bags hide cuttings; Oxford University Press, Samaria, Liverpool, 11 cs. printing paper; ———, Samaria, Liverpool, 2 cs. envelopes; G. F. Malcolm, Inc., Samaria, Liverpool, 11 cs, tissue paper; Atkinson Haserick & Co., Exeter, Genoa, 2 cs. paper; E. J. Keller Co. Inc., Satartia, ———, 45 bls. paper stock.

PHILADELPHIA IMPORTS

WEEK ENDING JULY 13, 1935

E. J. Keller Co. Inc., Indep. Hall, ———, 525 bls. rags; Castle & Overton, Inc., Indep. Hall, Bordeaux, 641 bls. rags; Castle & Overton, Inc., Indep. Hall, St. Nazaire, 533 bls. rags; E. J. Keller Co. Inc., Black Gull, ———, 152 bls. rags; Gottesman & Co. Inc., Ragnhildsholm, Sweden, 1250 bls. wood pulp; Gottesman & Co. Inc., Svaneholm, Sweden, 546 bls. wood pulp.

BALTIMORE IMPORTS

WEEK ENDING JULY 13, 1935

Congoleum Nairn Co., Indep. Hall, Bordeaux, 224 bls. rags; Congoleum Nairn Co., Indep. Hall, St. Nazaire, 125 bls. rags; Congoleum Nairn Co., Black Heron, Antwerp, 77 bls. rags; Congoleum Nairn Co., Waukegan, Havre, 156 bls. rags; ———, Lehigh, Glasgow, 108 bls. waste paper; Bulkley Dunton & Co., City of Havre, ———, 500 bls. wood pulp.

NEWPORT NEWS IMPORTS

WEEK ENDING JULY 13, 1935

Bulkley Dunton & Co., Dagmar Salen, ———, 3000 bls. wood pulp; Bulkley Dunton & Co., Breedyk, ———, 200 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING JULY 13, 1935

E. Butterworth & Co. Inc., Black Heron, Antwerp, 115 bls. bagging; N. Y. Trust Co., Black Heron, Antwerp, 103 bls. bagging; E. J. Keller Co. Inc., Black Heron, Antwerp, 67 bls. rags; National City Bank, Chastine, Maersk Kobe, 800 bls. bagging.

SAVANNAH IMPORTS

WEEK ENDING JULY 13, 1935

J. J. Ryan & Son Inc., Chastine, Maersk Kobe, 90 bls. cotton waste.

MONTREAL IMPORTS

WEEK ENDING JULY 13, 1935

Gottesman & Co. Inc., Idefjord, Sweden, 2500 bls. wood pulp; Gottesman & Co. Inc., Tyrifjord, Sweden, 10,200 bls. wood pulp.

Mrs. Anna I. George Gets Tax Refund

[FROM OUR REGULAR CORRESPONDENT]

NEWTON FALLS, N. Y., July 15, 1935—Announcement is made by the federal authorities of a refund of $21,700 in income taxes to Mrs. Anna I. George, for many years prominent in the paper industry of Northern New York. The rebate was allowed because of an over-assessment made in 1920. Mrs. George originally sought a refund of $38,792.41 which represented the difference between the $88,095 charged by the government and the $50,201.30 which she contends is the amount that should have been paid. Last fall the federal department announced the refusal of an application for the refund and its present granting of $21,700 leaves a sum which the plaintiff claims is still due.

The controversy with the government arose from the value of Newton Falls Paper Corporation bonds which she held. In 1920 when the property of the Newton Falls Paper Company was sold by the late Frank L. Moore and associates to the present owners the Moore group, of which Mrs. George was a member, received $1,650,000 of bonds in the new company. Soon after the paper market suffered reverses and the income of Mrs. George was affected. This was reflected in her income tax returns, the government appraising her paper company bonds at considerably higher value than she contended they were worth.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, July 17, 1935.

Despite the torrid weather during the past week, trading in the local paper market was fairly active. The volume of sales of the various grades of paper is generally running ahead of last year's record. Sales forces of the leading paper organizations are optimistic over the outlook for the Autumn.

The position of the newsprint paper market is practically unchanged. The total North American production for June amounted to 343,538 tons, according to information gathered by the News Print Service Bureau. Stocks of newsprint paper at Canadian and U. S. mills amounted to 74,267 tons on June 31.

Business in the fine paper market is holding up as well as expected. Demand for book, cover, writing and ledger papers is mainly routine. Prices are holding to schedule, in most instances. The coarse paper market is irregular. Demand for summer specialties, however, is persistent. The paper board market is rather dull.

Mechanical Pulp

The ground wood pulp market is inclined to be easy. Manufacturing operations in the United States, Canada and abroad are being maintained in sufficient volume to take care of current requirements and accumulations at the mills are not excessive. Quotations on both domestic and imported mechanical pulp are practically unchanged.

Chemical Pulp

Steadiness prevails in the chemical pulp market. Demand for the various domestic and foreign grades is well sustained. The feature of the week is the continued strength of kraft pulp. Bleached sulphite pulp is still firm, while other grades are holding up fairly well. Prices are holding to previously quoted levels.

Old Rope and Bagging

The old rope market continues quiet. Demand for domestic and imported old manila rope is restricted. Small mixed rope is only moderately active. Old rope prices are nominal. The bagging market is exhibiting a strong undertone. Offerings of scrap and gunny bagging are limited. Roofing bagging is steady to firm.

Rags

Conditions in the domestic rag market are showing signs of improvement. New cotton rags are stronger, especially No. 1 white shirt cuttings and fancy shirt cuttings, which are also in export request. Roofing grades are quite firm. The imported rag market is sharing the general betterment, despite seasonal dullness.

Waste Paper

The paper stock market is arousing more mill interest. Board mill demand for the lower grades should expand in the near future, according to many competent observers. Old kraft machine compressed bales are stronger than of late. The higher grades of waste paper are steady, especially hard and soft white shavings.

Twine

Most of the business transacted in the local twine market during the past week was along routine lines. Demand for the various varieties, however, has held up well this year and the outlook for the closing months is decidedly promising. The price situation is considered fairly satisfactory.

Indiana Wonders About NRA State Law

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, Ind., July 15, 1935—Now that the United States supreme court has made the NRA unworkable, the paper industry in Indiana is wondering what is to become of the Indiana law passed this spring which virtually was a state NRA bill and was designed to strengthen the national legislation.

Under the state law injunction suits and penalties could be secured for violations without the complaintants going into Federal court with their suits. The Indiana law provided that it could remain in effect until March, 1937. Already some suits have been filed under its provisions and these will be pushed regardless.

Governor Paul V. McNutt and other state officials are withholding judgment pending a study of the law, but members of the state NRA commission are inclined to the belief that the state law will be inoperative in view of the high court decision.

The law reads, "This act shall remain in effect until midnight of March 31, 1937, unless before that time the corresponding national legislation and the national codes of fair competition approved thereunder shall become inoperative, in which case all the provisions of this act shall likewise become inoperative."

Members of the commission expressed the fear that wage cuts and increased hours will be the results. There is no apparent danger of this in the paper industry, either among the manufacturers or jobbers. A survey of the situation shows that the Indiana industry plans no increase in hours or decrease in wages, nor is it apparent that the trade will go back to the old cut-throat competition for business that featured conditions two or three years ago.

In the meantime, state officials will ask the Indiana attorney general for an opinion concerning the status of the Indiana law.

W. Boyd Campbell Gets Weldon Medal

W. Boyd Campbell, of the Forest Products Laboratories of Canada, was awarded the Weldon Medal for his contribution of an outstanding paper entitled "The Structure of Fiber and Its Influence in the Making of Paper," which was presented at the annual meeting of the Technical Section of the Canadian Pulp and Paper Association, Montreal, P. Q., January 25, 1935.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, July 17, 1935.

BLANC FIXE.—Conditions in the blanc fixe market are practically unchanged. Prices are holding to schedule. The pulp is quoted at from $42.50 to $45 per ton, in bulk; while the powder is selling at from 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—No radical changes have transpired in the bleaching powder market. The contract movement is about normal for the season. Prices continue steady. Bleaching powder is quoted at from $1.90 to $2.15 per 100 pounds, in drums, at works.

CASEIN.—The casein market is dull. Domestic standard ground is quoted at 10¾ and finely ground at 11¼; Argentine standard ground at 13¼ and finely ground at 13½; French standard ground at 13½ and finely ground at 13¾ cents per pound, in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. Contract shipments are moving in good volume. Solid caustic soda is quoted at from $2.60 to $3.10; while the flake and ground are selling at from $3 to $3.05 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is moderately active. Prices are holding to schedule, in most instances. Imported china clay is quoted at from $13.50 to $21 per ton, ship side; while domestic paper making clay is selling at from $6.50 to $12 per ton, at mine.

CHLORINE.—Trading in the chlorine market is fairly active. Shipments against contract are moving in good volume. Prices are steady to firm. Chlorine is quoted at from $2 to $2.40 per 100 pounds, in tanks, or multi-unit cars, in ton lots, or over, at works.

ROSIN.—The rosin market is firmer. Paper making gum rosin is now quoted at $4.30 and wood rosin at $4.20 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $2.51 per 100 pounds, in tank cars, at works.

SALT CAKE.—Demand for salt cake is light at present. Prices are holding to schedule. Salt cake is quoted at from $12 to $13, and chrome salt cake at from $11 to $12 per ton, at works. Imported salt cake is selling at from $12 to $13 per ton, on dock.

SODA ASH.—The position of the soda ash market is little changed. Demand for this chemical is fairly persistent for the time of year. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20; and in barrels, $1.50.

STARCH.—The starch market is marking time. Demand from the paper mills is listless. The price situation, however, is unchanged. Special paper making starch is quoted at $3.59 per 100 pounds, in bags; and at $3.86 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—Paper mill demand for sulphate of alumina is fairly brisk. Prices are maintained at former levels. Commercial grades are quoted at from $1.35 to $1.50; while iron free is selling at from $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market continues steady. Sulphur is quoted at $18 per long ton on orders of 1,000 tons, or over, on yearly contracts; and at $20 per ton on any smaller quantity over that period. On spot and near by car loads, the quotation is $21 per ton.

TALC.—Business in the talc market is seasonally quiet. The contract movement is normal for the time of year. Domestic talc is still quoted at from $16 to $18 per ton, at eastern mines; while imported talc is selling at from $23 to $30 per ton, on dock.

Market Quotations

Paper

(F. o. b. Mill)

Ledgers	6.50	@	—
Bonds	6.00	@	—
Index	6.00	@	—
Writings—			
Extra Superfine	6.50	@	—
Superfine	6.25	@	—
Tub sized	5.75	@	—
Engine sized	5.50	@	—
Book, Cased—			
S. & S. C.	5.35	@	5.75
S. & S. C. Litho.	5.60	@	6.00
M. F.	5.10	@	5.50
Coated and Enamel	5.90	@	6.55
Coated Litho	5.90	@	6.55
Tissues—Per Ream—			
White No. 1	.82½	@	.85
White No. 2	.67½	@	—
Anti-Tarnish M. G. only	1.00	@	—
Colored	.85	@	—
Kraft	.70	@	—
Manila	.67½	@	.70
Manila—			
No. 1 Jute	9.00	@	9.25
No. 2 Jute	7.75	@	8.50
No. 1 Wood	4.00	@	5.25
No. 2 Wood	3.50	@	4.00
Butchers	4.00	@	4.50
Fibre Papers—			
No. 1 Fibre	4.25	@	5.50
No. 2 Fibre	4.00	@	4.75
Common Bogus	1.50	@	3.00
Screenings	2.50	@	3.50
Glassine—			
Bleached	.11	@	—
Unbleached	.09	@	—

(The following Quotations are Delivered New York)

News, per ton—			
Roll, contract	40.00	@	—
Rolls, spot	40.00	@	—
Sheets	45.00	@	—
Kraft—			
No. 1 Northern	4.12½	@	4.75
Standard	4.00	@	—
Southern	3.87½	@	—
Boards—per ton—			
News	32.50	@	35.00
Chip	30.00	@	32.50
Sgl. Mla. Lf. Chip	45.00	@	47.50
Jute Lined Chip	45.00	@	47.50
White Patent Coated	55.00	@	57.50
Binders Boards	67.00	@	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	21.00	@	22.00
Dry	21.00	@	22.00
(F.o.b. Mill)			
No. 1 Domestic and Canadian	18.00	@	24.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Division 1	2.60	@	—*
Division 2	2.55	@	—*
Division 3	2.50	@	—*
Prime Qualities—			
Class 1. All Prime Easy Bleaching	2.05	@	—*
Other Than Easy Bleaching—			
Class 2. Higher Than Standard	2.00	@	—*
Class 3, Standard	1.95	@	—*
Class 4. Lower than Standard	1.90	@	—
(On Dock, Atlantic Ports)			
Kraft No. 1	1.70	@	1.80
Kraft No. 2	1.50	@	1.60
(F.o.b. Pulp Mill)			
Kraft Domestic	1.70	@	2.35
(Delivered)			
Soda Bleached	2.50	@	—

*Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	5.75	@	6.00
Silesias No. 1	3.75	@	4.00
New Unbleached	6.25	@	6.50
New Soft Blacks	3.00	@	3.25
Blue Overall	3.50	@	3.75
Fancy	2.50	@	2.75
Washables	1.75	@	2.00
Mixed Khaki Cuttings	3.00	@	3.25
O. D. Khaki Cuttings	3.75	@	4.00
Men's Corduroy	1.50	@	1.75
New Mixed Blacks	2.50	@	2.75

Old Rags

White, No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	@	3.25
White, No. 2—			
Repacked	1.75	@	2.25
Miscellaneous	1.50	@	1.75
Thirds and Blues—			
Repacked	1.50	@	1.75
Miscellaneous	1.25	@	1.50
Black Stockings	2.50	@	3.00
Roofing Rags—			
No. 1	1.25	@	1.30
No. 2	1.20	@	—
No. 3	.95	@	1.00
No. 4	.95	@	1.00
No. 5A	.80	@	.85

Foreign Rags

New Rags

New Dark Cuttings	1.75	@	1.85
New Mixed Cuttings	1.80	@	1.90
New Light Silesias	3.75	@	4.00
Light Flannelettes	3.75	@	4.00
Unbleached Cuttings	6.50	@	6.75
New White Cuttings	6.50	@	6.75
New Light Oxfords	3.25	@	3.50
New Light Prints	2.75	@	3.00

Old Rags

No. 1 White Linens	7.50	@	8.00
No. 2 White Linens	6.50	@	7.00
No. 3 White Linens	4.50	@	5.00
No. 4 White Linens	2.25	@	2.50
No. 1 White Cottons	4.25	@	4.75
No. 2 White Cotton	3.25	@	3.75
No. 3 White Cotton	2.50	@	2.75
No. 4 White Cotton	1.90	@	2.15
Extra Light Prints	2.00	@	2.25
Ord. Light Prints	1.75	@	1.85
Med. Light Prints	1.55	@	1.65
Dutch Blue Cottons	1.75	@	1.85
French Blue Linens	2.30	@	2.40
German Blue Linens	2.15	@	2.25
German Blue Cottons	1.70	@	1.80
Checks and Blues	1.30	@	1.40
Linsey Garments	1.50	@	1.65
Dark Cottons	1.15	@	1.25
Old Shopperies	1.00	@	1.05
New Shopperies	.95	@	1.05
French Blues	1.70	@	1.80

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—			
Foreign	1.60	@	1.70
Domestic	1.45	@	1.55
Wool Tares, light	1.65	@	1.70
Wool Tares, heavy	1.75	@	1.80
Bright Bagging	1.65	@	1.70
Manila Rope—			
Foreign	1.85	@	2.00
Domestic	1.75	@	2.00
Small Mixed Rope	1.10	@	1.35
New Burlap Cut	2.00	@	2.35
Hessian Jute Threads—			
Foreign	2.60	@	2.75
Domestic	2.80	@	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.50	@	2.60
Ordinary Hard White No. 1	2.10	@	2.15
Hard White No. 2	1.90	@	2.00
Soft White No. 1	1.70	@	1.80
Flat Stock—			
Stitchless	.65	@	.75
Over issue Mag.	.65	@	.75
Solid Flat Book	.45	@	.50
Crumpled No. 1	.35	@	.40
Solid Book Ledger	1.50	@	1.65
Ledger Stock	1.00	@	1.10
New B. B. Chips	.30	@	.35
Manilas—			
New Env. Cut	1.70	@	1.80
New Cuttings	1.35	@	1.45
Print	Nominal		
Bogus Wrapper	.40	@	.50
Container	Nominal		
Old Kraft Machine—			
Compressed bales	1.10	@	1.20
News—			
Strictly Folded	.20	@	.25
No. 1 White News	1.20	@	1.30
Strictly Overissue	.60	@	.65
No. 1 Mixed Paper	.20	@	—

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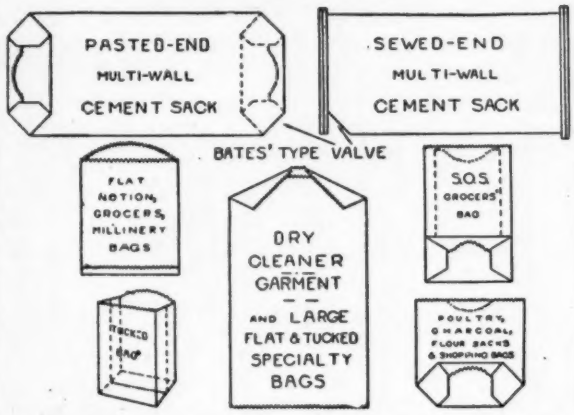
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Twines
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Coarse Polished—			
India	.11¼	@	.13¼
Belg. White Hemp	.12¼	@	.15¼
India Compress	.11¼	@	.12¼
Fine Polished—			
Fine India	.19	@	.21

CHICAGO

Paper
(F. o. b. Mill)

Bag Bond	.12	@	.50
Water Marked Sulphite Bond	.06¼	@	.11
Sulphite Bond	.05½	@	.11
Superfine Writing	.18	@	.24
No 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¼	@	.07¼
No. 2 S.&S.C. Book	.05¼	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¼
No. 1 Fibre	.04¼	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¼	@	.06¼
Sulphite Screenings	.03	@	.03¼
Manila Tissue	.05¼	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—			
Rolls, contract	41.00	@	—
Sheets, open	46.00	@	48.50
Boards, per ton—			
Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent coated	65.00	@	—
Container Lined—			
85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers
(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45
Old Newspapers—			
No. 1	.30	@	.35
No. 1 Mixed Paper	.25	@	.30
Rooting Stocks—			
No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper
(Delivered Philadelphia)

Bonds	.05-9/10	@	.38
Ledgers	.06 9/10	@	.40
Writings—			
Fine No. 3	.05	@	.06
Superfine	.10	@	.18
Extra Fine	.15	@	.26
Fine	.15	@	.26
Fine, No. 2	.10	@	.25
Book, M. F.	.05¼	@	.06¼
Book, S. S. & C.	.05½	@	.07½
Book, Coated	.06½	@	.09
Coated Lithograph	.06¼	@	.08½
Label	.07	@	.11
No. 1 Jute Manila	6.25	@	—
Manila Sul., No. 1	5.25	@	—
Manila No. 2	3.75	@	—
No. 1 Kraft	5.00	@	—
Southern Kraft	4.75	@	—
Common Bogus	.03	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00
Binder Boards—			
No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00
Tarred Felts—			
Regular	52.25	@	54.23
Slaters (per roll)	.84	@	.94
Best Tarred, 1-ply (per roll)	1.95	@	2.10
Best Tarred, 2-ply (per roll)	1.40	@	1.75
Best Tarred, 3-ply	2.00	@	2.45

Domestic Rags (New)
(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1	.03½	@	.04
New White, No. 2	.02½	@	.04
Light Silesias	.02½	@	.03
Silesias, No. 1	.03	@	.03½
Black Silesias, soft	.02½	@	.03
New Unbleached	.05	@	.05½
Washable, No. 1	.01½	@	.02
Blue Overall	.03½	@	.04
Cottons—According to grades—			
Washable, No. 2	.02½	@	.03
New Blue	.01½	@	.03
Fancy	.01½	@	.03
New Black Soft	.02	@	.04
New Light Seconds	.01½	@	.02
New Dark Seconds	1.50	@	1.75
Khaki Cuttings—			
No. 1 O.D.	.03	@	.04
No. 2 Mixed	.03	@	.04
Corduroy	.02	@	.03
New Canvas	.03½	@	.04½
New Black Mixed	.02½	@	.03½

Domestic Rags (Old)

White No. 1—			
Repacked	2.50	@	3.50
Miscellaneous	1.75	@	2.25
M. G.	3.00	@	3.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.50
Repacked	1.50	@	2.00
Black Stockings (Export)	2.00	@	3.50
Roofing Stock—			
Foreign No. 1	.50	@	.75
Repacked	.70	@	.85

Bagging
(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.25	@	1.30
Domestic	1.50	@	1.75
Manila Rope	2.00	@	2.25
Sisal Rope	1.25	@	1.50
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	1.25	@	1.30
No. 2	.80	@	1.00
Wool Tares, heavy	2.75	@	—
Mixed Strings	1.15	@	1.25
No. 1 New Light Burlap	2.25	@	2.30
New Burlap Cuttings	2.00	@	2.25

Old Papers
(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.25	@	2.30
No. 2 Hard White	1.90	@	2.00
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.25	@	1.30
No. 1 Mixed	—	@	.75
Solid Ledger Stock	1.50	@	1.60
Writing Paper	1.00	@	1.10
No. 1 Books, heavy	.55	@	.60
No. 1 New Manila	1.35	@	1.40
Print Manila	.50	@	.60
Container Manila	.45	@	.50
Old Kraft	1.00	@	—
No. 1 Mixed Paper	.23	@	.25½
Straw Board Chip	.20	@	—
Binders Board Chip	.20	@	—
Corrugated Board	.40	@	—
Overissue News	.50	@	—
Old Newspapers	.30	@	—

BOSTON

Paper
(F. o. b. Mill)

Ledgers—			
Sulphite	.06	@	.12½
Rag Content	.12	@	.30
All Rag	.36	@	.52½
Bonds—			
Sulphite	.07¼	@	.11
Rag Content	.12	@	.30
All Rag	.36	@	.65
Writings	.06½	@	.20
Superfines	.11	@	.31
Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08¾
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Label	.09½	@	.15
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¼	@	.06¾
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¾	@	.05
No. 2 Kraft	.04½	@	.04¾

(F. o. b. Boston)

Southern Kraft	.03¾	@	.04¾

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots.)

Common Bogus (Delivered New England points)	.02	@	.02¼
News Print Rolls	39.50	@	—
Straw Board, rolls	.009	—	@35.00
Straw Board in Sheets, basis 35s to 70s	—	@	40.00
Filled News Board	40.00	@	45.00
Chip Board	37.50	@	40.00
Chip Board (Creasing)	37.50	@	40.00
Single Manila Lined Chip	47.50	@	52.50
Single White, Patent Coated News Board (Bender)	55.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers
(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.00	@	2.20
No. 1 Soft White	1.75	@	1.90
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.55	@	.65
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.30	@	1.40
No. 1 Old Manila	.60	@	.65
White Blank News	1.15	@	1.20
No. 1 Kraft	1.00	@	1.05
Mixed Papers	.20	@	.22½
Print Manila	.40	@	.45
Container Manilas	.25	@	—
Overissue News	—	@	.35
Old Newspapers	.25	@	.27½
Box Board Chips	—	@	.25
Corrugated boxes	.32½	@	.37½
Screening Wrappers	.40	@	.45

Bagging
(F. o. b. Boston)

Manila Rope—			
Foreign	1.80	@	1.90
Domestic	1.50	@	1.75
Transmission Rope	.90	@	1.00
Jute Rope	1.50	@	1.60
Jute Carpet Threads	.65	@	.70
Gunny No. 1—			
Foreign	1.85	@	—
Domestic	1.35	@	—
Bleachery Burlap	4.00	@	4.50
Scrap Burlap			
Foreign	1.75	@	1.85
Domestic	1.30	@	1.35
Scrap Sisal	1.05	@	1.15
Scrap Sisal for Shredding	1.20	@	1.35
Wool Tares, heavy	1.50	@	1.60
New Burlap Cuttings	1.60	@	1.75
Australian Wool Pouches	2.50	@	2.75
Heavy Baling Bagging	1.50	@	1.60
Paper Mill Bagging	1.10	@	1.20
Bagging No. 2	.70	@	.75

Domestic Rags (New)
(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¾	@	.02
New White No. 1	.05½	@	.06
New White No. 2	.03½	@	.04
Silesias No. 1	.04¼	@	—
New Black Silesias	.02½	@	.03
Soft Unbleached	.05⅞	@	.06½
Blue Cheviot	—	@	4.6
Fancy	.0195	@	.021
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	.04	@	—
New Black, soft	.04	@	.04½
Khaki Cuttings	.03½	@	.03¾
O. D. Khaki	.03	@	.03¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.04¾
Paper Mill Bagging	1.10	@	1.25

Domestic Rags (Old)
(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.25	@	1.50
Thirds and Blues			
Repacked	2.00	@	2.75
Miscellaneous	2.00	@	2.25
Black Stockings	2.50	@	3.00
Roofing Stock			
No. 1	1.20	@	1.25
No. 2	.95	@	1.00
No. 3	.90	@	—

Foreign Rags
(F. o. b. Boston)

Dark Cottons	1.35	@	1.45
New White Shirt Cuttings	5.50	@	6.00
Dutch Blues	2.00	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.75	@	—
Old Linsey Garments	1.90	@	—

TORONTO

Paper
(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers (sulphite)			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (carloads)	5.00	@	—
No. 1 S. C. (carloads)	7.00	@	—
No. 2 S. C. (carloads)	6.50	@	—
No. 3 S. C. (carloads)	5.20	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	5.25	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft No. 2	5.40	@	—

(F.O.B. Cars Toronto)

News, per ton—			
Rolls (contract)	39.50	@	—
Sheets	42.00	@	—

Pulp
(F. o. b. Mill)

Ground wood	27.00	@	—
Unbleached sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper
(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.30
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	.60
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.60	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags
(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06	@	—
Fancy Shirt Cuttings	.02	@	—

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Bristol's Recording Liquid Level Gauge, Model 40M. Equipped with two pens for making two entirely different records on the one chart even for such low ranges as 0 to 4 inches of water.

OFTEN you want to know not only what the level or depth of water is, but how this is changing in comparison with some other level elsewhere.

For this purpose Bristol's Multiple-Record Liquid Level Gauge is used. It provides two records on the same chart. By the use of different colored inks, each record is distinctive. The pen arms face each other without interference, or confine the ranges covered to separate areas without overlapping.

Furnished with charts 12, 10 or 8 inches in diameter.

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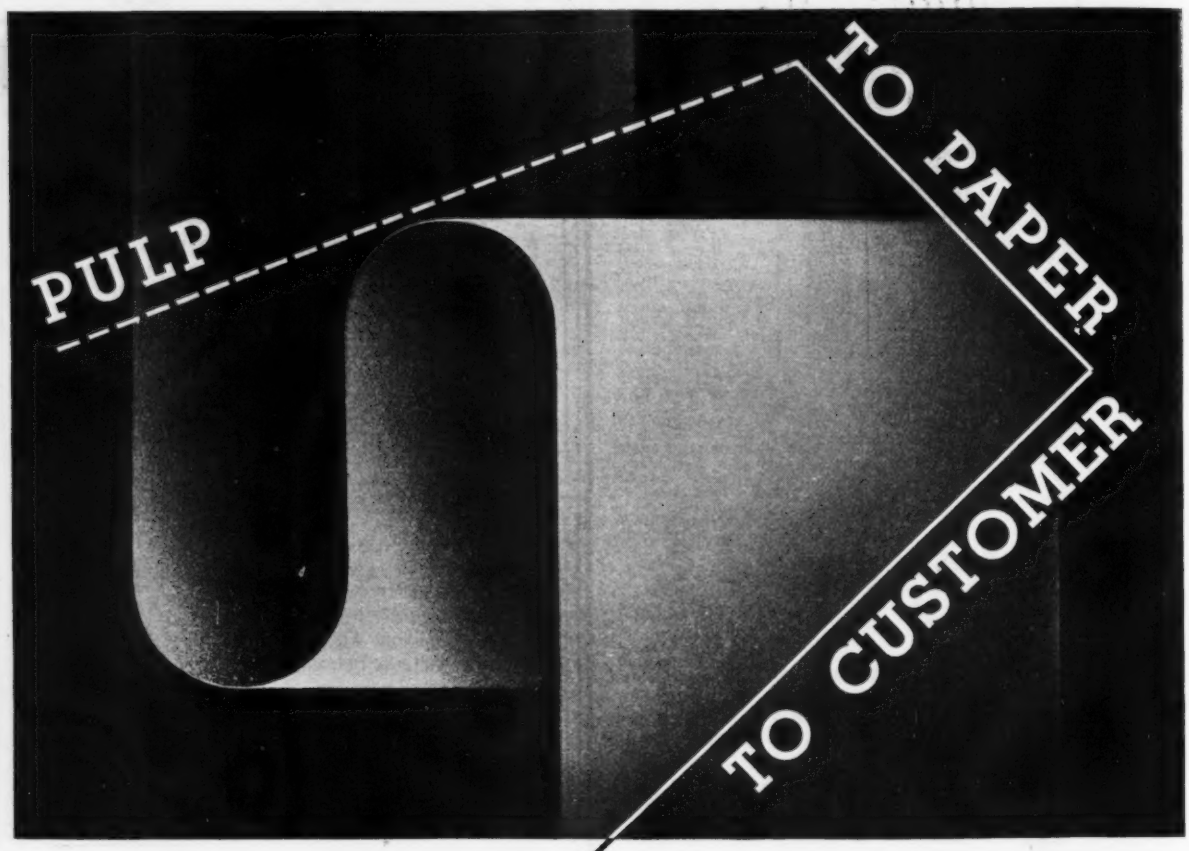
TABLE OF CONTENTS

NRA to make Study of Paper Industry	15
Chicago Market Displays Strength	16
Paper Salesmen's Activities	16
New Twine Rates Proposed	16
Estate of Rudolph Pagenstecher	16
Northern Ontario Pulpwood Cut Reduced	17
Spruce Falls Report	17
War Dept. Wants Waterproof Paper	17
Boston Market Conditions Favorable	18
Great Northern Staff Changes	18
Indianapolis Demand Continues Steady	18
Forbes Paper Co. Leases Building	18
Canadian-Japanese Trade War Threatened	21
Mersey Paper Co. Profits	21
Pacific Mills Earnings	21
New Paper Pulp in British Guiana	21
Philadelphia Market Continues Listless	22
Wallace Says U. S. Can Fill Own Pulp Needs	23
Chas. Ray Buys Home at New Mill Site	23
Obituary	24
Construction News	25
Editorial	**26**
Urge Maine to Aid Paper Industry	27
Westinghouse Profits Best in Five Years	27
Estate of David M. Anderson	27
Technical Section	
Pulp and Paper Industry Literature Review	29
An Instrument for Formation Measurement	31
Index, Technical Section, Vol. 100	37
Aetna Paper Co. Holds Up Removal Plans	41
Government Paper Awards	41
Union Paper Stock Co. Burned	41
Chaplin Corp. to Build Laboratory	41
F. W. Oughton Goes with Seymour Paper Co.	41
Ladies' Program—A Wow at TAPPI Meeting	42
Finch, Pruyn Wages Not to Change	42
Swedish Newsprint Production	42
Imports of Paper and Paper Stock	43
New York Market Review	**46**
Miscellaneous Markets	**43**
Market Quotations	**48**

THE PAPER TRADE JOURNAL is indexed in Industrial Arts Index

Want and For Sale Advertisements, 54-55



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